

CONDITIONS EFFECTING THE DISTRIBUTION OF BIRDS IN INDIANA.*

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GENERAL CONDITIONS.

The regular annual movements of birds, their migrations, are among the most striking of the manifestations of Nature. With the revivifying breath of spring, the absent birds return. Last fall, when the summer's work was done, they went to warmer climes. Now, they seek anew their breeding grounds. Some make their homes with us; others go farther north to rear their young. The semi-annual ebb and flow of these tides of bird-life, the breeding range and the food supply are general factors that enter into the distribution of birds everywhere. Our ancestors noted them as signs of the seasons. They exist today, though we do not see them so readily because of our changed conditions.

ZOÖLOGICAL AREAS.

Indiana is a meeting-ground of various birds. Into it range typical forms of different zoölogical regions. From the west, are prairie birds; slightly tinging the north, are northern forms; while the dominating influence of the lower part of the State is southern. Indiana lies within the eastern (Atlantic) faunal province. According to Mr. Allen, it is distinctively Carolinian (Bull. Mus. Comp. Zool. II. No. 3, pp. 393-395), yet the southwestern part is within the range of many birds characteristic of the Louisianian Fauna (Austroriparian Province of Prof. Cope, Bull. U. S. Nat. Mus. No. 1. 1875, pp. 67-71). Dr. Merriam would include the bulk of the State in the Upper Austral Zone, the Lower Austral Zone reaching into southwestern Indiana and the Transition Zone influencing the northern part (Bull. No. 10 Biol. Surv. U. S. Dept. Agr. 1898).

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DISPERSAL BY STORMS.

Following heavy storms, of wide extent, at sea, it sometimes happens that birds are blown or driven far inland. This, in part, accounts for the unusual occurrence, at times, of numbers of certain birds. One of the most notable instances of this was the wide dispersal of Brünnich's Murres (*Uria lomvia*) by a north-Atlantic storm, in December, 1896. They were driven as far south as South Carolina and over the eastern United States, at least to Indiana and Michigan. A number of specimens were taken in Indiana (Butler, *The Auk*, XIX, 1897, April, 197-200).

CHANGES IN CONDITIONS.

The birds about us are not those that were familiar to our fathers. Many kinds that were common to them have disappeared. Others that they did not know have come to take their places. In the early days of our history, dense forests stretched unbroken, save by water courses, from the Ohio River northward almost to Lake Michigan. Through these, threaded the runways of wild animals and the trails of wild men. Within the gloom of these continuous woodlands dwelt birds peculiar to such surroundings. With the clearing of our land, there disappeared from that area many forest-inhabiting birds. The range of others became restricted to the remaining timber districts. Meadows and pastures replaced the forests. Birds loving such surroundings, prairie forms, there made their homes.

The beautiful little Carolina Paroquet (*Conurus carolinensis*), which once ranged in countless numbers throughout the eastern United States, as far north as the Great Lakes, has not only disappeared from our limits, but also from almost every part of its range. From but a few almost inaccessible localities in the Southern States has it been recently reported, and it is now on the verge of extinction. It was last reported in Indiana from Knox County in 1859 (Hasbrouck, *The Auk*, VIII, Oct. 1891, pp. 369-379; Butler, *Ibid*, IX, Jan., 1892, pp. 49-56).

The Ivory-billed Woodpecker (*Campephilus principalis*), the largest representative of its family, was found in the early part of this century in suitable localities in southern Indiana, notably in Franklin and Monroe counties and in the lower Wabash Valley. Their shy, retiring ways led them to leave when men appeared bearing the evidences of civilization.

They have almost entirely disappeared from earth. A few individuals linger among the almost inaccessible regions of the Southern States (Hasbrouck. *The Auk*, VIII. 1891, pp. 174-176).

The Pileated Woodpecker (*Ceophlœus pileatus*), known to the early settlers as Logcock and Black Woodcock, was familiar to the eyes and ears of the early colonists. They were averse to sharing their haunts with the white man. Less and less their numbers grew. They disappeared from one locality after another, until now but few are left in the more sparsely settled districts of the State (Butler. *Birds of Ind.*, 1897, p. 838).

The croak of the Raven (*Corvus corax sinuatus*) was a familiar sound to the early pioneers. They saw its numbers lessen from year to year, until their children, now, never see its form and do not know its voice. From one locality after another, the few remaining birds have disappeared, until at this time it is probable that none are to be found within the State. Until within the last five or six years, they have been known to nest in Martin and Dubois counties, but I can learn of none having done so since (Proc. Ind. Acad. of Sci., 1897, p. 202).

The Wild Turkey (*Meleagris gallopavo*), our most noble game bird, has been generally extirpated, although it is still reported from Knox, Gibson and other counties of the lower Wabash Valley. It, probably, is also to be found, in rare instances, in some of the wilder regions, elsewhere, in southern Indiana. It formerly was numerous throughout the State.

The Swallow-tailed Kite (*Elanoides forficatus*) is known but to few. In 1812, Alexander Wilson reported these graceful, giant, swallow-shaped birds as abundant upon the prairies of Ohio and Indiana Territories (*Amer. Orn.*, VI, 1812. p. 70). For seventy years after that but one was reported from Indiana (Haymond. *Proc. Phil. Acad. N. S.*, Nov., 1856. p. 287). Since then they have been seen at irregular intervals in the southern two-thirds of the State.

Wild Pigeons (*Ectopistes migratorius*) were formerly found in such countless numbers that no estimate could be made of their abundance. During the season of their flight, flocks of enormous size successively passed, obscuring the sun and sometimes hiding the sky. At night, they gathered in roosts in favorite localities. These roosts were often of great extent. They alighted upon the underbrush, crushing it to the ground, and so weighted the trees that limbs of large size were broken off by the

burden put upon them. After the first third of the century, their numbers began noticeably to diminish; but few large flights were seen in our State after 1870. Ten years later, they had almost disappeared. Now, they are nearly extinct. A few individuals are to be found in certain localities in the rougher portions of southern Indiana (Proc. I. A. S., 1899).

In the extreme northern part of the State, prairies and swamps, lakes and woodland alternate. The marshes and lowlands of northwestern Indiana form attractive spots to many swamp birds and waterfowl. Different kinds of ducks collect there and a number of species breed in the more retired places. Formerly, they were much more numerous. There, also, the Whooping (*Grus americana*) and Sandhill Cranes (*Grus mexicana*) bred in numbers. Snipe and Plover were found abundantly. Phalaropes and Black Terns (*Hydrochelidon nigra surinamensis*) frequented the lakes and ponds. Gallinules, Coots and Grebes still rear their young. Rails of four species make their homes among the reeds. Marsh Wrens and both the American (*Botaurus lentiginosus*) and Least Bitterns (*Ardetta exilis*) frequent the sedges; while the stems of these plants are drawn together to form nesting places for the Red-winged (*Agelaius phoeniceus*) and Yellow-headed Blackbirds (*Xanthocephalus xanthocephalus*), and their tops are woven into the globular nests of the two species of Marsh Wrens. The dryer marshes are the breeding grounds of such rare forms as Henslow's (*Ammodramus henslowii*) and Nelson's Sparrows (*Ammodramus candacutus nelsoni*). The swampy woodland is the home of other water-loving species. Among the tops of the tallest trees are still to be found the small remnants of large colonies of Great Blue Herons (*Ardea herodias*) and Black-crowned Night Herons (*Nycticorax nycticorax naevius*). Here, too, we have recently learned that the beautiful White American Egrets (*Ardea egretta*) commonly made their homes, nesting in colonies or heronies. By this fact, its known breeding range is extended northward a distance about equal to the length of this State (Proc. I. A. S., 1897, pp. 198-201). Among the tree-tops, too, were to be found the nests of the Osprey (*Pandion haliaetus carolinensis*) and Bald Eagle (*Haliaeetus leucocephalus*). In the larger cavities in the tree trunks, the Wood Ducks (*Aix sponsa*) still rear their broods, and the deserted Woodpecker holes in the old snags are occupied by White-bellied Swallows (*Tachycineta bicolor*) and Prothonotary Warblers (*Protonotaria citrea*).

All this has greatly changed. Some of these characteristic forms have almost disappeared, while the draining of the swamps and the reclaiming of the land have lessened the area favorable for the homes of others. Few, indeed, are the numbers of most of these birds in this region compared with the innumerable company that occupied it a half century or more ago.

Field Sparrows (*Spizella pusilla*), Vesper Sparrows (*Pooecetes gramineus*), Dickcissels (*Spiza americana*), Grasshopper Sparrows (*Ammodramus savannarum passerinus*) and Meadowlarks (*Sturnella magna*) are representatives of those that sought the fields with which man replaced the native woods. Others, such as the Bobolink (*Dolichonyx oryzivorus*) and Prairie Horned Lark (*Otocoris alpestris praticola*), also extended their range as favorable localities were found. At the time of the settling of our State, the breeding-grounds of the Bobolink within our present limits were probably about the southern end of Lake Michigan, extending southward over the prairies of the Kankakee Basin and eastward as far as the site of Rochester. Possibly some bred in the smaller prairies in the northeastern part of the State. From these points they have gradually spread southward, extending their breeding range as far south as the counties of Union, Decatur, Marion and Vigo. They are not numerous there; but under favorable conditions, a few may be found at nesting time, enlivening the scenes of rural life with their charming songs, as far south as has been indicated (Butler, Proc. I. A. S., 1896). The Prairie Horned Larks, too, from practically the same districts, have gradually been found to nest farther south until they have been reported as breeding in Franklin, Decatur, Johnson, Monroe and Knox counties. Following their extension southward, their numbers have gradually increased until now they are familiar birds in many places where they were unknown a few years ago (Butler, Birds of Ind., 1897, pp. 874-6).

As tillable land is neglected and begins to grow up in bushes and briars, other birds press in to occupy such congenial haunts. The most notable of these, perhaps, are Bachman's Sparrow (*Peucaea aestivalis bachmanii*), the Lark Sparrow (*Chondestes grammacus*), the Cardinal or common Redbird (*Cardinalis cardinalis*) and the Yellow-breasted Chat (*Icteria virens*). All these have been observed to be extending their range, where conditions are favorable; but the extension, perhaps, is the most striking in the case of the two sparrows first mentioned.

From the south other forms are ranging into our limits. The Black Vulture (*Catharista atrata*) was found by Audubon in southern Indiana. From 1834 to 1879, it was not reported from the Ohio Valley. It was next noted in Indiana in 1879 (Quick, J. C. S. N. H. 1881, p. 341). It is now recognized as a resident in some numbers in the lower Wabash and Whitewater valleys, and is found in regularly increasing numbers in the southern third of the State. Bewick's Wren (*Thryothorus bewickii*) is slowly spreading over the same district (Trans. Ind. Hort. Soc. 189, p. 99). It soon becomes acquainted with man and takes up its abode about his home. In that region, it becomes the House Wren, replacing the larger Carolina Wren (*Thryothorus ludovicianus*) which has, latterly, to a great extent, left the vicinity of man's structures and inhabits the thickets and the underbrush of the more open woods. These are not to be confused with the smaller Short-tailed Wren, the true House Wren (*Troglodytes aedon*), that breeds in central and northern Indiana. Other birds, also, have changed their habits. The Purple Martin (*Progne subis*), Barn Swallow (*Helidon erythrogaster*) and Phoebe (*Sayornis phoebe*) have generally sought after other breeding sites than the cliffs and bluffs where the white men first found their nests. The Chimney Swift (*Chaetura pelagica*) now prefers an unused chimney to a hollow tree. We have become so accustomed to these sociable birds that it is hard to realize that they have not always been dwellers with man about his home. Some of them, most notably the Eave Swallow (*Petrochelidon lunifrons*) and the Purple Martin, have been the birds most persecuted by the European House Sparrow (*Passer domesticus*), generally called "English Sparrow." They have made use of the nests of the former; have occupied the sites of the latter. The result is that comparatively few of either of these birds are left with us.

INFLUENCE OF RIVERS.

The rivers of Indiana penetrate the State from different directions, and each has its influence, be it greater or less, upon the distribution of life. The most prominent streams are the Wabash and its tributaries, and the Whitewater and Kankakee. Lake Michigan touches our limits; and its effect is likewise felt. The extension southward into the upland meadows, between the water courses, of the birds of the open prairies, and the

range of southern forms up the valleys of our streams is as though the great spread fingers of two mighty hands were interlocked, the one representing the extension of life southward and the other the projection of southern birds northward.

The region of the Lower Wabash, with its bottoms, cypress swamps and ponds, was the home of many southern birds which found there the northern limit of their range. Among these congenial surroundings were noted such southern forms as the White Ibis (*Guara alba*), Wood Ibis (*Tantalus loculator*), Yellow-crowned Night Heron (*Nycticorax violaceus*), Little Blue Heron (*Ardea cærulea*), Snowy Heron (*Ardea candidissima*), American Egret (*Ardea egretta*) and Florida Cormorant (*Phalacrocorax dilophus floridanus*). Some of these there made their homes and reared their young. Other birds ranged farther up the stream and it, and other water-courses, are now known to be routes along which certain species move to breeding grounds farther north.

The extreme effect of a river on the distribution of a bird is illustrated in the case of the Prothonotary Warbler. Prior to 1875, it was regarded as solely a bird of the Southern States, yet its actual range was then, without doubt, practically the same as we now know it. In that year Mr. E. W. Nelson observed it to be common in the Lower Wabash Valley in Illinois (Bull. Essex Inst. Vol. IX, 1877. p. 34). In 1878, Mr. William Brewster found it abundant in Knox and Gibson counties, Indiana (Bull. Nutt. Orn. Club, Vol. III, 1878. p. 155). The natural haunts of these birds are the swampy woods and the thickets along water-courses or about ponds or lakes. As one suitable locality after another was discovered farther northward, it was found to be occupied by these birds. They were reported from Vigo, Clinton and Carroll counties and from just over the State line near Danville, Illinois. They extended up the Mississippi River, sending off numbers of migrants up the different river courses. Some ascended the Kaskaskia and others the Illinois (Loucks Bull. Ill. Lab. N. H., Vol. IV, 1894). The Kankakee, a tributary of the latter stream, comes into northwest Indiana from the west and becomes quite a factor in its influence upon bird life. At Mokence, Illinois, its course is blocked by an outcrop of stone. Above this, it is a sluggish stream, at times widening into lakes. Much of its course is bordered by woods. Marshes and swamps alternate with thickets and sloughs along its valley. Amid such attractive surroundings, Prothonotary Warblers find summer quarters and are characteristic birds. They likely reach

this valley by way of the Illinois River, though possibly some may come from the Wabash Valley. The divide between the Kankakee Basin and the Lake Michigan Basin is but a slight barrier. Occasionally, these birds are found near the Lake Shore in Lake and Laporte counties, and at places along the St. Joseph River and its tributaries, both in Michigan and Indiana (Cook, Birds of Mich. 1893, p. 110). In St. Joseph County, Michigan, and the counties of Elkhart, Lagrange, Steuben, and in the adjoining county of Dekalb, in this State, they have been found, at some places, breeding commonly. The Prothonotary Warbler has never been reported along the Ohio River above the mouth of the Wabash.

The Sycamore Warbler (*Dendroica dominica albilora*) is another bird that prefers the vicinity of streams and in its migration follows their courses. It is found not only along the Wabash River, but also along the Ohio and Whitewater. It is common up the Wabash River to Carroll County and has been noted from Lafayette and Ft. Wayne. There is nothing to show that it is found in the Kankakee Valley or reaches the basin of Lake Michigan. It is common up the White River Valley, as far as Indianapolis, and up the Whitewater River to Brookville, ranging to Connersville and Richmond. By one of these routes, it pushes on to southeastern Michigan. There, it has been found in some numbers in the valley of the Raisin River, Monroe County, in Kalamazoo County, and has been reported as not uncommon near Detroit.

The Cerulean Warbler (*Dendroica rara*) is not a bird living solely along the streams, but appears to prefer the wooded sides of the valleys. It extends its range up the Wabash River to Carroll, Tippecanoe and Wabash counties. It has been found at English Lake near Kouts in the Kankakee Valley. It ranges up the Whitewater River to its upper waters; is found about Muncie; is tolerably common in Dekalb County; and is one of the most common woodland birds in Monroe, Wayne and Ingham counties, Michigan. These localities are probably reached by way of the Whitewater or Miami river. It, like both the Warblers previously referred to, breeds in suitable places throughout its range. Each of these three species frequents different kinds of localities; the Prothonotary Warbler, as noted, prefers the wooded swamps; the Sycamore Warbler seeks the tall timber along the streams, preferably, as its name indicates, the sycamore trees; the Cerulean Warbler occupies the woods of the river valleys, but appears to prefer the wooded hillsides that

border them. Each is notably affected in distribution by the water-courses.

EFFECT OF LAKE MICHIGAN.

The effect of a large interior body of water is well illustrated by Lake Michigan. There, on the open water, many kinds of water fowl, that would otherwise go south, remain through the winter. To it, come different forms of sea birds in spring, winter and fall. Among these are Jaegers, the rarer Gulls and some Sea Ducks.

It also attracts such cosmopolitan birds as the Knot (*Tringa canutus*), Turnstone (*Arenaria interpres*) and Sanderling (*Calidris arenaria*). The latter and the Semi-palmated Plover (*Egialitis semipalmata*) are found along its shores in considerable numbers in late summer. The Belted Piping Plover (*Egialitis meloda circumcincta*), a bird supposed to breed much farther northward, has been found breeding along the pebbly lake beach. The effect of the lake upon the local climate has been observed by farmers. The result is noticeable in the fruiting of plants. Fringing the southern shores of Lake Michigan are sandhills or dunes of varying sizes, some reaching an altitude of more than 150 feet. Upon and near these, grow northern pines and other characteristic vegetation. As would be expected, birds that love homes among the pines are to be found. While comparatively little study has been given to this region, it is known that the Pine Warbler (*Dendroica vigosii*) breeds there (Brayton. Proc. Ind. Hort. Soc. 1879. p. 108). Other northern forms have been reported, and it is likely careful investigation will show other interesting facts concerning this district. Wherever pines grow, the American Crossbills (*Loxia curvirostra minor*) seem to be more or less regularly found. This is not only true among the sand-dunes near Lake Michigan, but about Lafayette, Bloomington and Brookville. At each of the two first named places, they have been reported as breeding. While this would not be surprising the reports have not been verified. The pines in other restricted areas, notably Pine Hills, Montgomery County, and the Knobs in southern Indiana, are interesting fields for the study of these points.

The most notable influence in the bird-life of our State is the changes that have been wrought through man's influence. The general condi-

tions of migration, breeding and food supply are those common to all regions. They operated in the days of the aborigines as they do this year, differing only in some of their manifestations. The unusual conditions, such as storms, effecting the dispersal of birds, work now as hitherto. There are special conditions manifested in favorable surroundings, attractive bird-homes, and in topographical encouragement, leading them to extend their range. These are strongly illustrated in this State. To him who carefully studies the birds of any locality, these powerful influences are apparent. They are emphasized by their details and their repetition. By grouping the results of local observations, is told the story of the influences acting in the distribution of the birds of the State.

