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THE MIDSUMMER BIRD LIFE OF ILLINOIS: A STATISTICAL STUDY

BY

STEPHEN A. FORBES

ERRATA AND ADDENDA

Page 54, lines 3 and 2 from bottom, and elsewhere in Article III, for *Cassia chamaechrista* read *Cassia chamaecrista*.
Page 62, between lines 4 and 5 from bottom of table insert *Erigeron annuus*.
Page 101, table, after *Croton glandulosus* read var. *septentrionalis;* and for *Equisetum laevigatum* read *Equisetum hyemale* var. *intermedium*.
Page 131, line 3, for *coerulea* read *caerulea*.
Page 138, last line, for *Ziza* read *Zizia*.
Page 141, line 21 from bottom, dele *Diodia teres*.
Page 169, between lines 3 and 4, insert as follows:
Erigeron annuus (L.) Pers. An interstitial in the bunch-grass association in the Hanover area.
Page 177, line 5, for *eastward* read *westward*.
Page 209, line 3 from bottom, for *copalina* read *copallina*.
Page 210, line 13 from bottom, for *Diospyrus* read *Diaspyros*.
Page 211, line 5, for *Foresteria* read *Forestiera*.
Page 256, line 3 of table, for Dr. H. *M*. Pepoon read H. *S*. Pepoon.
Page 278, line 16, the fifth word should be in Roman type.
Page 286, line 6 (second column), page 295, list of secondary species (second column), and page 353, line 8 from bottom, for *hiemalis* or *hiemale* read *hyemale*.
Page 313, line 4 from bottom (first column), for *pedicularis* read *pedicularia*.
Page 315, line 10, second column, for *Apocynum* read *Apocynum*.
Page 323, line 3 from bottom, for *Cyperus* read *Scirpus*.
Page 330, line 14, for *virginianum* read *virginicum*.
Page 336, lines 3 and 2 from bottom, for *virginicum* read *virginianum*.
Page 337, line 2 from bottom, for *philadelphicum* read *philadelphicus*.
Page 339, in first list of invading species, for *Rhus hirta* read *Rhus typhina*.
Page 351, line 4 from bottom, for *xerophtic* read *xerophytic*.
Page 355, above line 6 from bottom, insert *Scirpus heterochaetus* Chase.
Page 356, line 14 from bottom, for *Symlocarpus* read *Symplocarpus*.
Page 360, line 14, for *Pirus* read *Pyrus*.
Page 362, after line 7, insert *Acer saccharinum* L.
Page 363, line 2 from bottom, for *quadiflorum* read *quadriflorum*.
Page 365, line 14, for *thapus* read *thopsus*.
Page 369, last line, for *Tanecetum* read *Tanacetum*.
Page 417, line 1, dele *the*.
Page 497, line 9 from bottom, for *neglible* read *negligible*, and in foot-note, for *Austalt* read *Anstalt*.
Page 498, line 4 from bottom, for *Lockport* read *Chillicothe*.
Page 500, line 13 from bottom, after *up* insert *in*.
Page 501, line 2 from bottom, for *dissolving* read *dissolved*.
Page 504, line 23, for *gryina* read *gyrina;* line 17, for *dentata* read *knickerbockeri*.
Page 506, line 11, for *vernata* read *ternata*.
Page 507, line 3 from bottom, for *Mazon* read *wagon*.
Page 513, line 19, for *Nepa* read *Zaitha;* line 18, and page 517, line 13 from bottom, page 520, line 12 from bottom, and page 532, line 4, read *naid* or *naids* for *naiid* or *naiids*.
Page 517, line 6 from bottom, for *pondweed* read *pickerel-weed*.

Page 519, for first sentence of last paragraph read as follows:

We have no exactly comparable chemical data for July; but analyses for August give percentages of saturation for Morris and Marseilles as follows: 20.4 per cent. at Morris on the 11th and 11 per cent. at Marseilles on the 12th; 16.35 per cent. at Morris on the 22d and 23d and 7.4 per cent. at Marseilles on the 24th and 25th.

Page 521, line 6 from bottom, and page 529, line 9, for *chrysoleucas* read *crysoleucas.*

Page 525, line 22, and page 536, lines 21 and 24, for *Ekmann* read *Ekman.*

Page 532, line 1, for *Ancyclus* read *Ancylus.*

Page 551, line 7, for *00* read *512.*

Page 615, second line above foot-note, for *106* read 94.

Page 616, line 1, for the second *Bündeln* read *Bündel;* line 2, for *Bündeln* read *Bündels;* line 3, for *aussern* read *ausseren;* line 6, for *zwcierlie* read *zweierlei.*

Page 629, line 12, for *kein* read *keinen.*

Page 634, line 9, for *unternommen* read *unternommenen;* and in line 14 from bottom, after *575* insert *13 fig.*

Plate III, Fig. 1, after the word *mixed* in legend insert *consocies of the.*

Plate IX, Fig. 2, dele the legend and read instead: Root-system of *Tephrosia virginiana,* exposed by blowing of the sand.

Plate X, Fig. 2, dele the legend and read instead: A blowout almost stabilized by bunch-grasses, especially *Leptoloma cognatum.*

Plate XXXIX, for *Calamogrostis* read *Calamagrostis.*

Plate LIV, exchange places of cuts, but not the legends.

Plate LXXXV, for *7* read *7c.*

ARTICLE VI.—*The Midsummer Bird Life of Illinois: A Statistical Study.** By STEPHEN A. FORBES.

In the course of a statistical survey of the bird population of the State of Illinois, begun with a view to a better knowledge of the significance of birds in the economy of nature, two field observers, A. O. Gross and H. A. Ray, engaged in this work as assistants on the State Natural History Survey, spent virtually a month of the summer period of 1907 in each of the three principal sections of the state—June in southern, July in central, and August in northern, Illinois. Selecting in each section a locality typical for that part of the state, they made regular trips on foot in various directions and to various distances, traveling always thirty yards apart, and noting as they went the species and numbers of all birds flushed by them on a strip fifty yards in width, including likewise those flying across this strip within a hundred yards to their front. They kept record, also, by means of mechanical counters, of the distances traveled over each distinguishable kind of area, commonly marked by the crop which is borne.

The present paper is a report of a few of the more general results of a study of the materials thus brought together, illustrating the numbers and ecological distribution of the birds of Illinois during the relatively stable period of their summer residence—the time between the conclusion of the spring migration and the beginning of the fall movement to the southward. It is a period of breeding and steady habitation for our most permanent and characteristic bird population, and will best help us to an understanding of the main normal ecological significance of Illinois birds.

THE AREA OF OBSERVATION

The total distance traveled by my observers on these various midsummer trips was 428 miles (omitting fractions), of which 141 miles was in southern Illinois, 112 in central, and 175 in northern. The total area covered by this strict census of the bird population was a trifle over 12 square miles, or 7,693.5 acres—33 per cent. of this acreage being in the southern, 26 per cent. in the central, and 41 per cent. in the northern, part of the state—or approximately a

*Reprinted from the American Naturalist, Vol. XLII, August, 1908.

third of this area in southern, a fourth in central, and two fifths in northern, Illinois. The field observations began in the south June 4, and ended at the north August 23, with the idea of avoiding, so far as possible, by this order of progress, differences due to different seasonal conditions. It was not possible, of course, to eliminate these wholly, with only one pair of observers; and it will tax our ingenuity, and sometimes perhaps oxertax it, to detect these differences and to distinguish them from those due to mere difference of latitude and of climate corresponding.

The total surface on which these precise midsummer observations were made was 1/4720 part of the whole state, and the question at once arises, Was this area sufficient to give these results any general value for the state at large, and, if so, how may we be sure of it? There is, I believe, no mathematical method of determining the sufficiency of these data for generalization purposes, and I know of no test at present applicable except that of the general consistency and reasonableness of the totals, averages, and ratios, for the different districts and seasons, the presence or absence of which each can readily see for himself as this discussion proceeds. If the data of observation are insufficient for the uses made of them, there will be a random variability and inexplicable irregularity in my statistical summaries which we shall not fail to notice.

General Product of the Survey

Gross and Ray identified during the summer, on the territory covered by their data, 7,740 birds, belonging to 85 species. This is at the rate of 645 birds per square mile, or almost precisely 1 per acre, including the so-called English sparrow. If we omit the 1,414 interloping English sparrows observed—which is a little more than 18 per cent. of the entire number of birds—we have remaining 527 *native* birds to the square mile. The total for Illinois,* on this basis, is 30,750,000 native birds and 5,536,000 English sparrows, or approximately 14 summer resident birds to each person in this state living in the country or in towns of less than 25,000 inhabitants.

Of the 85 species represented by the 7,740 birds recognized on these trips, the 21 most abundant species were represented by 6,596 birds. That is to say, 85 per cent. of the birds belonged to 25 per cent of the species. The 21 more abundant species numbered, taken

*A combination of the averages for the three sections of the state, computed separately, the data for the sections being differently weighted to compensate for differences in area.

together, 550 to the square mile, and the 64 less abundant species, taken together, numbered 95 birds to the square mile, or 1 to every 6¾ acres. The latter species are evidently negligible as general factors in the ecological system, and attention need be given, in discussing the birds of the state as a whole, only to the 21 species common enough to produce some appreciable general effect. Given in the order of their abundance they are as follows.

A. O. U. Nos.	Bird	No. observed	Per cent.
X	English sparrow	1,414	18.4
501	Meadow-lark	1,025	13.2
511b	Bronzed grackle	900	11.6
316	Mourning-dove	461	6.
604	Dickcissel	393	5.1
498	Red-winged blackbird	347	4.4
474b	Prairie horned lark	296	3.8
412	Flicker	197	2.6
761	Robin	194	2.5
563	Field-sparrow	186	2.4
529	American goldfinch	158	2.
444	Kingbird	126	1.8
494	Bobolink	119	1.5
546	Grasshopper sparrow	110	1.4
705	Brown thrasher	104	1.3
495	Cowbird	102	1.3
406	Red-headed woodpecker	99	1.3
613	Barn swallow	96	1.2
289	Quail	91	1.2
261	Bartramian sandpiper	89	1.1
488	Crow	89	1.1
		6,596	85.2

Variation with Latitude

The English sparrow decreases in abundance from north to south, from 147 to the square mile in northern to 113 in central, and 82 in southern, Illinois. One hundred sparrows in the northern part of the state are thus represented by 77 in the central and 56 in the southern part.* The *native* summer residents, on the other hand, increase in numbers from north to south, the birds per square mile being 464, 537, and 600 for northern, central, and southern Illinois, respectively. That is, 100 native birds in northern Illinois were represented in midsummer by 116 in central and 129 in southern Illinois. The decrease in English sparrows from north to south is

*Since the above was written, my attention has been called, by Dr. Hans Gadow, to the fact that in Europe also this sparrow diminishes in number southward.

not sufficient to offset the increase in the native species, the total numbers per square mile for all summer birds in the three sections of the state being 610, 650, and 682—or 100 birds in northern for 107 in central and 112 in southern Illinois.

This same gradation was much more pronounced in the record of the *winter residents*. From the last of November to March 15, birds averaged 384 to the square mile in northern Illinois; from December 23 to March 21, 582 to the mile in central Illinois; and from February 6 to February 21, 832 to the mile in southern Illinois,—numbers related to each other as 100, 151, and 217. Indeed, we find birds more abundant in extreme southern Illinois in the midwinter period of 1906-07 than in the midsummer period of 1907, averaging at the rate of 122 birds in the former season to each hundred in the latter.

If we take into account the numbers for the whole year, there are for every hundred birds in the northern part of the state, 133 for central and 181 for southern Illinois.

Birds by Sections

	Northern Illinois	Central Illinois	Southern Illinois
Summer:			
Native	100	116	129
Sparrows	100	77	56
All birds	100	107	112
Winter:			
Native	100	170	292
Sparrows	100	65	1
All birds	100	151	217
Whole year:			
All birds	100	133	181

The bobolink was a distinctly northern bird, occurring in the ratio of 24 to the square mile in northern Illinois, and not at all in either of the other sections. The mocking-bird, on the other hand, was almost exclusively southern, being represented by 8 birds to the square mile in the southern section, by only 1 specimen seen in central Illinois, and not at all in the northern part of the state.

Migration Waves

In a paper published in April, 1907, under the title "An Ornithological Cross-section of Illinois in Autumn,"* I gave the data and re-

*Bull. Ill. State Lab. Nat. Hist., Vol. VII, Art. 9.

sults of a trip across central Illinois made by Gross and Ray during the fall of 1906. A comparison of the general average of the bird population, determined from the data of this trip for the period of the fall migrations, with the midsummer average for the same section of the state, as determined July, 1907, shows an interesting difference which leads us to consider the effect of the autumnal movement to the south on the numbers of the local bird population. On the above trip across the state, made between August 28 and October 17, 1906, a general average of 579 native birds to the square mile was found, while the corresponding midsummer average for the year 1907, is 537 native birds to the square mile—a difference of 42 birds to the mile, or nearly 8 per cent, in favor of the fall population.

Native Birds per Square Mile, Fall (1906), Summer (1907)

	Migrant	Resident	Total
Summer		537	537
Fall	98	481	579
Difference	+98	—56	+42

Was this difference due to the fact that the fall migration was in progress when the observations for 1906 were made? That is, does the migration movement begin first at the north and result in a local wave of increased numbers, birds coming in from the north earlier and faster than the resident species leave for the south? It is possible to answer this question by reference to the data of the paper just cited.

An analysis of the list of species identified on the autumnal trip of 1906, shows that 481 per square mile of these birds were summer residents, still remaining, and that 98 per square mile belonged to migrant species, on their way to the south. The summer residents still present in this autumnal period were thus 56 per square mile fewer than the resident birds of the summer of 1907. That is, 56 summer residents for each square mile of central Illinois had gone south, on an average, and 98 fall migrants had, on the other hand, come in to take their place, the difference between these numbers giving us the excess of 42 birds per square mile of fall over summer. This temporary increase of 8 per cent. in autumn in the average number of our birds is thus evidence of a wave of condensation running southward in consequence of the earlier beginning

and more rapid development at the north of the annual fall migration.

This contrast of the number of the resident summer population with that of the fall migration period is still more clearly and strongly shown by a comparison of the totals of all our central Illinois observations in midsummer and in fall, respectively. These average 1.07 birds to the acre for the period from July 9 to September 21, and 2.31 per acre for the interval between the 1st and the 26th of October. That is, more than twice as many birds per acre were seen in October, 1907, as in July, August, and September.

The data of the *spring* migration of 1907 are unsatisfactory owing to the extraordinary character of the season, and the consequent repeated interruption and remarkable prolongation of the movement. Nevertheless, they indicate a larger population during the early part, at least, of this migration period also than either before or after it. A trip down the eastern side of the state from Cook to White county, begun March 26 and ending April 11, gave an average of 1.34 birds to the acre—a number to be compared with our midsummer average for the whole state, which is 1.03. That is, the average early spring population of this exceptional year was 30 per cent. greater than the average of the summer following. On the other hand, a trip across central Illinois between April 20 and May 29, still within the migration period, gave us, for 5⅓ square miles of area, an average of only .89 per acre—less than even the midwinter average of .91 for the same part of the state.

Vegetation of the Inspection Area

As a basis for a more precise account of the distribution of birds as a whole and of the more important species, it will be necessary to consider the vegetable covering of the soil, since there is little else in Illinois by which different portions of its area may be distinguished. The territory traversed by my observers, it need hardly be said, was almost wholly under cultivation. Excluding only forests in which the trees were too high, or the undergrowth was too dense, to permit a full and accurate census of the birds, the territory reported upon was chosen wholly at random, and the total for each division of the state seems sufficient to give us, with the exception just mentioned, a fair sample of its crops and surface conditions. The areas from which all the birds were determined were 3,172 acres for northern Illinois, 2,117 acres for central, and 2,504 acres for southern.

In the upper third of the state, 95 per cent. of the surface was in corn, small grain, and grass—31 per cent. in corn, 27 per cent. in small grain (nearly all of it oats), and 37 per cent. in the pasture and meadow crops, about equally in each. In the central region the area in corn rises to 46 per cent. of the whole, that in small grains was about 26 per cent. (again nearly all oats), and that in the forage crops was 27 per cent. (the pasture lands nearly twice as extensive as the meadows)—a total of 99 per cent. of the area examined which was devoted to these great farm crops. In the lower third of Illinois only 23 per cent. of the land was in corn, an almost equal area (21 per cent.) was in small grain—more than half of it wheat—and 44 per cent. was in grass, clover, and similar forage plants, rather equally divided between pastures and meadows. That is to say, the areas in corn and small grains were nearly the same, and these together were barely equal to the meadows and pastures. The total

Crop Areas. Per cent., 1907

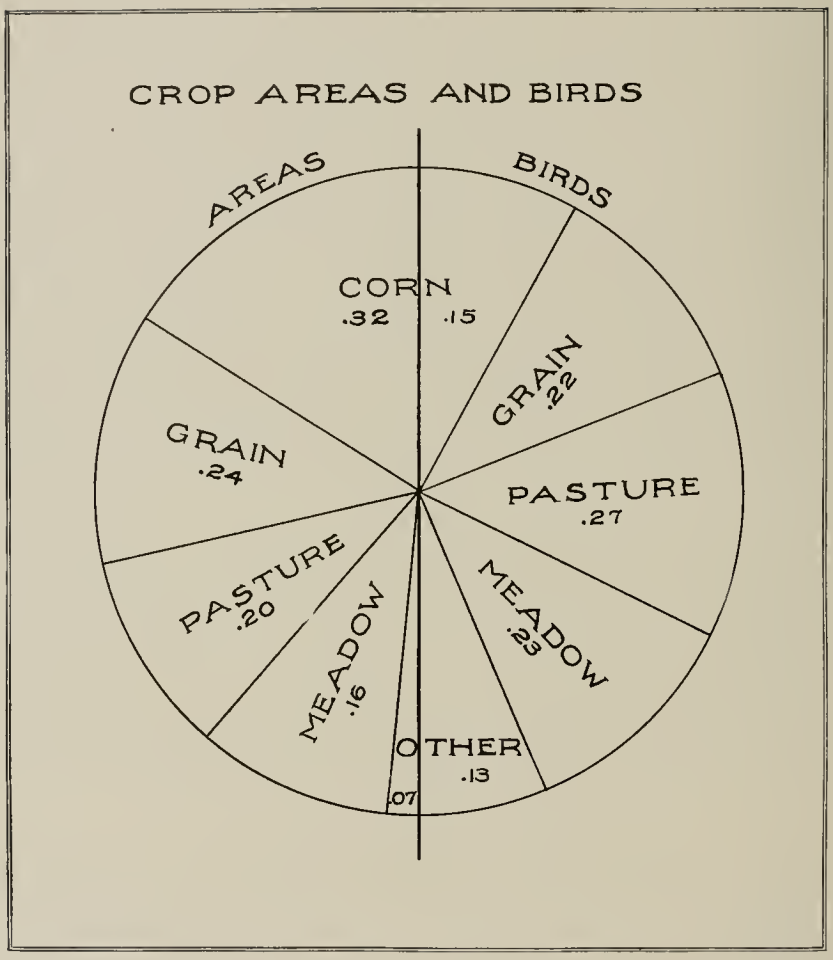
	Northern Illinois	Central Illinois	Southern Illinois
Corn	31	46	23
Grain	27	26	21
Grass	37	27	44
Miscellaneous	5	1	12

in all these crops was 88 per cent. of the area inspected, the remaining 12 per cent. covering the orchards, the more open woods, the waste and untilled lands, and a few additional minor items.

Numbers of Birds by Crops

Illinois is still a prairie state in the predominance of birds which prefer a grassy turf as an abiding place. Almost exactly half of those recorded for the state in the summer of 1907 were from pastures and meadows, although the total acreage in these lands was but 36 per cent. of the entire area inspected. These figures are equivalent to a density ratio on pastures and meadows of 1.39 for all the birds of the state.* Corn is an exotic crop in Illinois, and birds were only about a third as abundant in corn fields as in grass lands, while in small grains they were nearly twice as abundant as in corn. The acreage in these crops was such that 15 per cent. of all the birds of the season were found in corn fields and 22 per cent. were in small

*That is, taking an average density of the bird population for the whole area of the state as 1, the density in pastures and meadows only is 1.39.



grain. In orchards they averaged 4½ times as numerous to the unit of area as in fields of grain, 2,471 to the square mile—giving a density ratio of 3.84; but the acreage in orchards from which the birds were identified was so small that all the orchard birds together amount to only 2 per cent. of the whole number observed. Among native trees and shrubbery, birds were much less abundant than among fruit trees, and the density ratio for these situations was about 2.25.

By way of further illustration of the application of this quantitative method to the subject of local distribution, I will present some

of the more pronounced results for one species of bird throughout its range in summer, and for one kind of crop area as visited or inhabited by midsummer birds.

The Meadow-lark

One thousand and twenty-five meadow-larks were identified by my observers in their work on the summer residents of the state, an average of 85 to the square mile for the whole area traversed by them. As these birds were unequally distributed, never occurring, for example, in woodlands or among shrubbery, their numbers rose in some situations far above this general average, amounting to 266 to the square mile in stubble, 205 in meadows, 160 on untilled lands, 143.5 in pastures, and 131 on waste lands, and falling to 10 to the square mile in fields of corn.

Meadow-larks per Square Mile. Summer, 1907

Stubble	266
Meadows	205
Fallow	160
Pastures	143.5
Waste	131
Corn	10
Woods	—
Shrubs	—
State	85

They varied also in abundance, in a very interesting way, from the north to the south. One hundred of them in northern Illinois were represented by 175 in central and by 215 in southern Illinois. This variation was evidently independent of any difference in the extent of surface covered by the kinds of vegetation which they most prefer, since the, ratio of pasture, meadow, waste and untilled lands taken together was considerably less for central than for northern Illinois, although the meadow-larks were 75 per cent. more numerous; and it was only a fourth greater for southern Illinois than for northern, although the meadow-larks were more than twice as abundant. The cause of the greater numbers southward, so far as I can see, can be accounted for only rather vaguely as climatic.

Much more difficult of even general or hypothetical explanation is a curious difference in the observed abundance of meadow-larks in pastures and meadows respectively, in the three divisions of the state. In northern Illinois there were 87 larks per square mile in pastures to 129 in meadows; in southern Illinois there were 125 in

pastures to 297 in meadows; while in central Illinois this relation was reversed, the number in pastures being 274 to the mile, and that in meadows 189. That is, while 100 pasture birds were represented in northern Illinois by 148 in meadows, and in southern Illinois by 242, in central Illinois they were represented by only 69. Since the southern Illinois observations were made in June, those for central Illinois in July, and those for northern Illinois in August, one naturally looks to differences in season, in the advancement of the crops, or in agricultural operations as related to the haunts and habits of these birds, for an explanation of their apparent shift from meadows to pastures in July in central Illinois, and a seemingly plausible explanation is suggested by the fact that haying was mainly done during July in the central part of the state, but was not yet fairly begun in southern Illinois in June and was nearly over in northern Illinois in August.

Pasture Birds per Square Mile. Summer, 1907

Meadow-larks

	Northern Illinois	Central Illinois	Southern Illinois
Pasture	87	274	125
Meadow	129	189	297
Other Pasture Birds			
Pasture	50	54	120
Meadow	200	131	371

If, however, the meadow-larks were disturbed to this extent by the operations of making and saving the hay crop, one would expect to find the other distinctively meadow birds similarly affected—a supposition which is not borne out by the facts of our record. Besides the meadow-larks, there were five common species more abundant in meadows in one or another section of the state than in any other important situations; namely, the red-winged blackbird, the purple grackle, the vesper-sparrow, the grasshopper sparrow, and the dickcissel. Each of these species was, moreover, more abundant in meadows than in pastures in each section of the state—in central Illinois as well as in the other two—excepting only the grackle in southern Illinois. Taking all five of these birds together, there were in northern Illinois 200 to the square mile in meadows and 50 in pastures, in central Illinois 131 and 54, respectively, and in southern Illinois 371 and 120. In other words, for each hundred of these

five kinds of birds in meadows, there were, in the northern section, 25 of them in pastures, in the central section 41, and in the southern section 32. The cause of this apparent change in the preference of the meadow-larks of central Illinois seems, therefore, something peculiar to themselves, and is still to seek.

Birds of the Pastures

The birds of a given situation may be discussed from two quite different standpoints, both interesting and pertinent, and both really necessary to a complete understanding of the facts. We may consider the members of an assemblage of species there with first reference to their relative importance to the situation itself—with reference, that is, to their comparative numbers, or to the nature and effect of their activities; or we may consider the situation with first reference to its relative importance in the economy and life of each species of bird which inhabits or visits it. If this situation is woodland, for example, a bird found only in forests might, if a comparatively rare species, have very little importance—might produce very little effect in the situation because of its infrequent occurrence there, while to the species itself the forest situation would be all-important, as the sole place of its habitation. Its own significance in forests might be easily overbalanced by a very abundant species which should visit woodlands only occasionally, but whose average numbers there might be twice or thrice as large to the unit of area and time as those of the less abundant species inhabiting forests exclusively. Time will not permit me to illustrate this division of my topic from both these points of view, and I will limit myself to a few words in conclusion on the *pasture birds* as a group and on some of the more prominent pasture species with reference to their importance in pastures.

Pasture lands were the preferred resort of our most abundant midsummer birds. That is, more birds were seen in pastures than in any other of the larger crop areas of the state—2,107 in that situation as against 1,814 in meadows, 1,752 in fields of small grain, and 1,169 in fields of corn. Indeed, 27.2 per cent. of all the midsummer birds determined by my observers were seen in pastures, 23.4 per cent. in meadows, 22.6 per cent. in small grain, and 15.1 per cent. in corn. The area in pastures was larger than that in meadows, however, and on this account, if we consider the number of birds per square mile, we must change this order of precedence. With a general midsummer average of 645 birds to the square mile

for the whole state, we have 920 to the mile for meadows, 878 for pastures, 562 for small grain, and 300 for corn. Or, if we take the number per square mile for the entire state as 1, 1.36 will be the density ratio for pastures, 1.43 for meadows, .87 for grain fields, and .47 for corn fields.

Summer Birds in Crops, 1907.

	Numbers	Ratio	Per square mile	Densities
Pastures	2,107	27.2	878	1.36
Meadows	1,814	23.4	920	1.43
Grain	1,752	22.6	562	.87
Corn	1,169	15.1	300	.47
Other	898	11.6		

Looking to the composition in species of this midsummer pasture population, we find that more than half the summer resident birds of Illinois pastures belong to five species—the English sparrow, the meadow-lark, the crow-blackbird, the horned lark, and the field-sparrow, relatively abundant in the order named; and this statement is almost as true of the three sections of the state as it is of the state as a whole. Comprising nearly 53 per cent. of the pasture birds of the entire state, these five species made 49 per cent. of those of northern Illinois, 61 per cent. of those of central Illinois, and 47.5 per cent. of those of southern Illinois. Indeed, the first four of these species were the most abundant pasture birds of the whole state for the whole year, occurring there in the following numbers: English sparrows, 1,394; crow-blackbird, 696; meadow-lark, 686; horned lark, 603; and field-sparrow, 230. These are consequently our most typical pasture birds. In the pastures of the state at large the English sparrow was the most abundant species, making 20 per cent. of all the birds seen in pastures during the summer months, and the meadow-lark was nearly as common, making 17 per cent. of these birds. The meadow-lark was, indeed, the *most* abundant pasture bird in both southern and central Illinois, the sparrow surpassing it only in the northern division of the state. The horned lark, on the other hand, was second in northern Illinois, but tenth in both central and southern Illinois, and fourth for the state as a whole. The crow-blackbird was third on the list for the whole state, fourth for southern Illinois, third for central, and sixth for northern Illinois.

Ten species comprised more than two thirds of the pasture birds of the state, and these same ten species made 63 per cent. of the

birds of northern Illinois pastures, 80 per cent. of those of central Illinois, and 64 per cent. of those of southern Illinois. Besides the five species already mentioned, these were the flicker, the robin, the mourning-dove, the red-headed woodpecker, and the red-winged blackbird.

One general impression made by this preliminary examination of the present bird population of the State of Illinois is that of a remarkable flexibility and tenacity of the associate and ecological relationships of birds in the face of revolutionary changes in their environment. Apart from the results of the introduction of the English sparrow, and the direct destruction of game birds and birds of prey, the main effect of human occupation seems to have been the withdrawal of most of the prairie birds from the area devoted to Indian corn, and their concentration in pastures, meadows, and fields of small grain—situations which most nearly resemble their original habitat.