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An Intensive Ornithological Survey of a Typical Square Mile of Cultivated Prairie

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AN INTENSIVE ORNITHOLOGICAL SURVEY OF A TYPICAL SQUARE MILE OF CULTIVATED PRAIRIE

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The present paper is a report on an intensive ornithological survey of a typical section of prairie farm land in northwestern Iowa. In making the survey several objects were in view. Besides merely making a census, it was hoped that some light might be thrown on the relation of birds to various crops, the effect of constant tillage on bird life, etc. It was thought that the exact data accumulated now would furnish a basis for comparison at a future time. With some such means of measuring the actual increase or decrease of the bird population, we will be in a better position to determine the problems of our bird life.

Methods.—It was first planned to divide the section into twenty-four equal strips, extending east and west; and it was expected that one trip through each of these strips would be sufficient to gather complete information as to the number of birds within its area.

However, when the work was begun it was found that the birds were very unequally distributed, that certain areas were without any individuals, while other areas were densely populated. Consequently greater attention was given to the latter areas and less to the former, which consisted chiefly of corn-fields. It is possible that a very few birds may have been missed (not over half a dozen) in the corn-fields because of their being less carefully worked. There was another chance for error in the region of the swamp; for here the slough grass was so dense and high that a few sparrows may have been overlooked. However, for the greater part of the section the results are reasonably accurate.

Topography.— The section selected for the study is about three miles southeast of Sioux City, and forms a part of the W. A. Hickman farm. For identification its location is given thus: section 11, Woodbury township, T. 88 N., R. XLVII W. This particular section was chosen because it was believed to be typical of the upland prairie, as distinguished from the lowland prairie, or river bottom. It was the "rolling prairie" of the earlier days, when it was covered with the native prairie grass. The northeast

quarter is crossed diagonally by a creek which drains from the southeast to the northwest. In the summer only a small rivulet of water flows through this. But in the spring there is usually an overflow which inundates a considerable surface in this quarter, and converts it into a dry slough; that is, one which is wet in the spring and early summer but becomes dry later. The slough grass in this area grows to a height of six feet, and is usually mowed for hay. The ground has never been cultivated. This uncultivated slough has an area estimated at about eighteen acres.

The other three-quarters are practically alike topographically. There is no level stretch, but the surface is alternately high and low with gentle slopes intervening. These areas were under cultivation or used as pastures.

Figure 63 is a diagram of the section as it was planted to crops at the time the survey was made, viz., July 25 and 26, 1916.

Crops and Habitats.— The untilled portions of the section

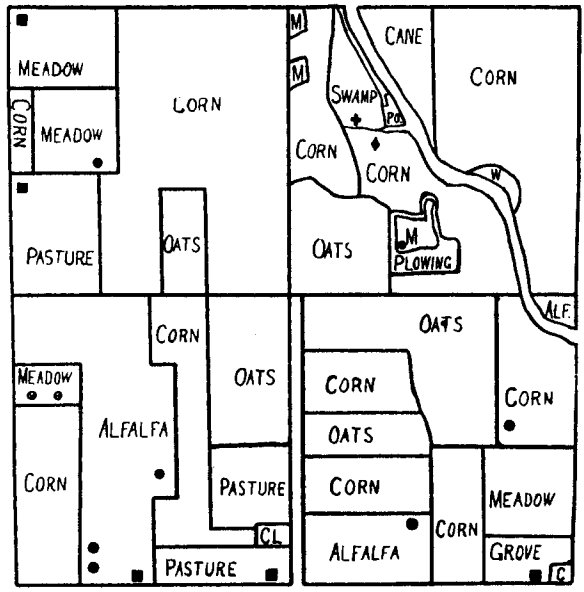

Fig. 63. Diagram of the surface of the section studied showing the crop plantings and certain topographical features. In general, it also is a diagram of the ecological habitats of the area.

were of four kinds: (a) swamp and creek; (b) artificial grove and orchard; (c) pasture; (d) meadow. The slough has already been described sufficiently. The grove was composed of large maple trees with a few boxelders; these had been planted to serve as a windbreak. The orchard consisted of about fifty small, scraggly apple trees. The term "meadow" is used for the areas from which cattle were excluded and from which hay is cut. The term "pasture" is applied to those grass fields in which horses and cattle are allowed to graze.

The principal crop was corn, there being about two hundred and ninety acres of this out of the total of six hundred and forty. The next largest acreage was in oats. And it will be noted from the table that the percentage of bird life in both these areas was very low.

The crops were all mature or nearly so. Corn was over-head high, but still green. The corn fields were so hot and dusty that to walk through them at mid-day was very uncomfortable. And it is likely that they were just as uninviting to the birds as they were to man. The cane field was about four feet high, and so dense that in walking through it one constantly stumbled in the thick growth. The oats and alfalfa were all harvested, with the exception of one field (of probably fifteen acres) of alfalfa.

Distribution.— The total number of birds found on the section was four hundred and eighty. This included thirty-two species with the Dickcissel leading numerically. Following the Dickcissel in order of abundance were the English Sparrow, Western Meadowlark, Barn Swallow, and Bank Swallow. With one exception the birds were not found in flocks, but were more or less evenly distributed in pairs and small groups. However, one mixed flock of Barn and Bank Swallows was found circling low over an alfalfa field which was being mowed at the time. These birds probably were attracted by insects arising from the newly cut alfalfa.

One fact of interest is demonstrated by the density map. This shows very well that the greatest number of birds was found along the roadsides, along the creek, and near farms. The creek probably attracted birds by means of the shade and water which it provided. The farm yards furnished food and nesting sites for the numerous English Sparrows. But the cause of the dense population along the roadsides is not so easy to explain. It might be assumed that the birds were attracted to the brush and weed thicket along the fences; but this is not a sufficient

Fig. 64. This may be called a population density map, and becomes intelligible when superimposed upon the habitat map.

explanation, because of the fact that the fence rows between grain fields did not seem to be especially rich in bird life. Of course the untilled strip between the fields was not as wide as that along the roads, nor did it, as a rule, contain as varied a group of plants. In these respects the roadsides would have an advantage. Besides these factors there might be mentioned the telephone poles along the roads which offered nesting sites to such birds as the Flicker and the Red-headed Woodpecker. The Dickcissel also was very frequently seen perching on the telephone wires; and it is possible that many of the numerous Dickcissels thus noted came to the wires from farther back in the fields. The same reasoning might also be applied to several other species as well. However, I do not think it can be denied that the strip of untilled and relatively undisturbed ground along the fence and road was so well adapted to nesting and feeding that birds were drawn to it. Perhaps the fact of greater density along the roadsides, as distinguished from the fence rows within the section, needs verification. This phase of the problem was not particularly in mind when the work was done.

Table I gives a summary of almost all the data taken during the survey. The species are listed from top to bottom in order of their abundance. The crop and habitats are given at the top of

the table. Thus by tracing over from the name of the species its abundance in a given crop may be found. The list is headed by the Dickcissel, which was, as may be seen from the table, very generally distributed over the section. The English Sparrow stands second in rank largely because of its abundance around farms. The large flock of Barn and Bank Swallows already mentioned accounts for their position near the top of the list. No birds were recorded for the potato, cane, or clover fields. The list of thirty-three species may be regarded as a typical list of this locality's summer birds.

Table II shows the acreage of each crop and habitat. The acreage is, of course, estimated, but is based upon the testimony of those familiar with the land. The number of birds in each habitat is also given, as well as the ratio of the birds to the area, and the number of birds per acre. Several interesting facts are shown, among them being the one that in the farm yards there were twice as many birds per acre as in the pastures. Each bird in farm yards had one-fifteenth of an acre to itself as contrasted with the birds in the corn-fields, where each bird had fifty acres to forage over. The table also shows that the average number of birds per acre, taking the entire square mile into account, was three-fourths of a bird per acre; or, putting it differently, each bird had an average of one and one-third acres to itself. The only birds found in or near corn fields were Dickcissels. The small number (five) seems to show that the corn was not inviting even to this well distributed species.

Oats had a slightly larger number, but the average per acre was very small. The oats had just been harvested, and it might be expected that the field would contain more than the alfalfa fields. However, this was not the case either as to individuals or as to species. Large numbers of Swallows were flying over the alfalfa; and Dickcissels, Field Sparrows, and Meadowlarks were quite numerous. Pastures were excellent feeding places. The average per acre in meadows was slightly larger than in the pastures. The bird life in the two habitats was very similar, however. Such birds as the Grasshopper Sparrow and Prairie Horned Lark were found in the meadows. The meadows were well adapted to the nesting of Sparrows and Larks, as well as to the Burrowing Owls.

The swamp and creek were very attractive to bird life. Not only did birds breed there in considerable numbers, but it served as a shelter from the hot sun and a source of drinking water.

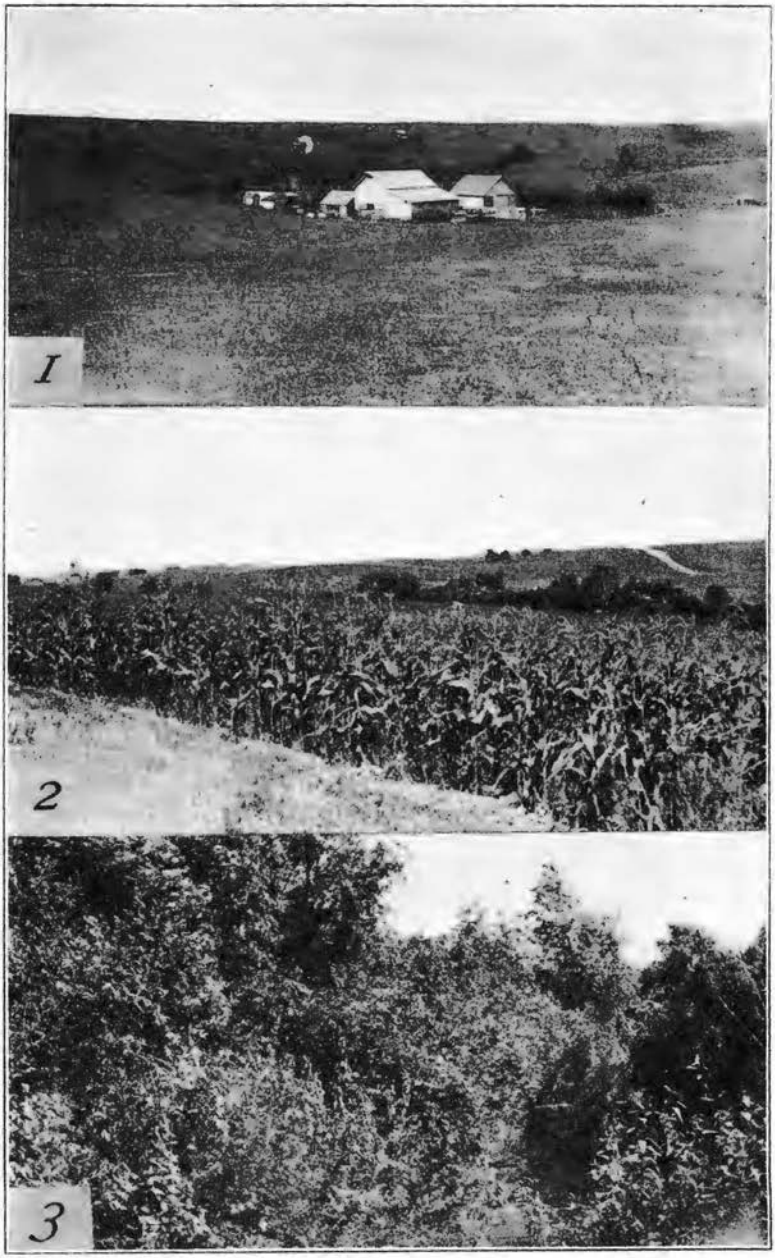

Fig. 1. A photograph which shows the rolling character of the area.
Fig. 2. A cornfield is dense, and while it may not be called impenetrable, the results of the present study show that it is not frequented by birds.
Fig. 3. A view of the willow thicket along the creek. It affords shelter, concealment and nesting sites, with water near by.

Red-winged Blackbirds were common in the swamp, and a pair of Marsh Hawks had a nest there.

Several birds were feeding in the plowed field, among them being the Prairie Horned Lark and Field Sparrow. The young apple trees in the orchard contained many birds. Some of them were feeding in the foliage, others were merely resting in the branches. The grove had a representative group of woodland birds, such as the Flicker, Bluejay, Red-headed Woodpecker and Chickadee.

In closing I wish to express my obligations to the W. A. Hickman family for their kind hospitality, and to Prof. T. C. Stephens for the suggestion of undertaking the work and for aid during its progress.

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TABLE I. SUMMARIZING THE CENSUS BY CROPS

	Farm	Roadsides	Grove and Orchard	Alfalfa	Pasture	Oats	Meadows	Plowing	Corn	Swamp and Creek	Flying	Clover	Cane	Total
1. Dickcissel	..	11	3	18	5	7	12	..	5	10	2	..	..	73
2. Western Meadowlark	..	2	..	9	16	9	6	..	..	..	6	..	..	48
3. Barn Swallow	2	..	..	35	2	..	2	..	..	..	2	..	..	43
4. Bank Swallow	..	..	..	40	..	..	2	..	..	..	..	..	..	42
5. Kingbird	6	2	3	4	14	..	..	..	..	..	..	..	...	29
6. Goldfinch	..	..	..	11	4	..	3	..	..	2	3	..	..	23
7. Red-winged Blackbird	..	..	..	..	..	..	..	..	..	21	..	..	..	21
8. Mourning Dove	..	2	..	..	2	..	2	..	..	2	9	..	..	17
9. Prairie Horned Lark	..	..	..	..	2	..	8	5	..	..	..	..	..	15
10. Field Sparrow	..	4	1	7	1	..	..	..	..	..	..	..	..	13
11. Grasshopper Sparrow	..	2	..	..	2	..	7	2	..	..	..	..	..	13
12. Robin	..	2	1	3	1	..	..	..	..	1	1	..	..	9
13. Red-headed Woodpecker	..	5	2	..	..	1	..	..	..	..	..	..	..	8
14. Maryland Yellowthroat	..	..	..	..	..	..	..	..	..	7	..	..	..	7
15. Cowbird	..	..	..	2	..	..	..	..	..	1	3	..	..	6
16. Flicker	..	2	2	..	1	..	..	..	..	..	..	..	..	5
17. Burrowing Owl	..	..	..	..	..	..	5	..	..	..	..	..	..	5
18. Chickadee	..	..	5	..	..	..	..	..	..	..	..	..	..	5
19. Marsh Hawk	..	..	..	..	..	..	..	..	..	2	3	..	..	5
20. Yellow-billed Cuckoo	..	1	1	..	..	..	..	..	..	2	..	..	..	4
21. Brown Thrasher	..	3	..	..	..	..	..	..	..	..	..	..	..	3
22. Bluejay	..	..	3	..	..	..	..	..	..	..	..	..	..	3
23. Yellow Warbler	..	..	..	..	..	..	..	..	..	2	..	..	..	2
24. Indigo Bunting	..	..	..	..	..	..	..	..	..	1	..	..	..	1
25. Screech Owl	..	..	..	..	..	..	..	..	..	1	..	..	..	1
26. Lark Sparrow	..	..	..	..	1	..	..	..	..	..	..	..	..	1
27. Catbird	..	..	..	..	..	..	..	..	..	1	..	..	..	1
28. Bronzed Grackle	..	..	..	..	..	..	..	..	..	..	1	..	..	1
29. English Sparrow	55	..	..	..	..	..	..	..	..	..	5	..	..	60
30. Unknown	..	..	..	..	2	..	..	..	..	3	8	..	..	13
31. Swamp Sparrow?	..	..	..	..	..	..	..	..	..	1	..	..	..	1
32. Cuckoo sp.	..	..	1	..	..	..	..	..	..	..	..	..	..	1
33. Shrike sp.	..	..	..	..	..	..	..	..	..	..	1	..	..	1
Totals	63	36	22	129	53	17	45	7	5	59	44	..	..	480

TABLE II.

	Corn	Oats	Alfalfa	Pasture	Meadow	Grove and Orchard	Cane	Creek and Swamp	Plowing	Farm	Clover	Potatoes	Roadside	Flying	Total
Acres per Crop.....	290	111	70	70	45	14	12	12	7	6	2	1	0	0	640
Birds per Crop.....	5	17	129	53	45	22	0	59	7	63	0	0	36	44	480
Birds per Acre.....	.017	.15	1.84	.075	1	1.51	0	4.91	1	10.5	0	0	..	..	.75
Area per Birds in Acres..	58	6.5	.54	1.32	1	.63	..	.20	1	0.95	..	..	..	..	1.33