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COMPOSITION OF WOODLAND BIRD COMMUNITIES IN EASTERN KANSAS

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The great North American deciduous forest reaches its western extremity in eastern Kansas. The number of tree species and their sizes are reduced here relative to more easterly localities having consistent summer rainfall. Additionally, the animal communities of deciduous forests are to some extent less well-expressed in Kansas than in places lying to the east. Lesser numbers of bird species in Kansas relative to those of forests in eastern states is readily documented (e.g., Zimmerman and Tatschl, 1975, Wilson Bull., 87:196-206), even though woodland and forest birds are the most numerous kinds of birds in all of Kansas (Johnston, 1965, Univ. Kansas Publ. Mus. Nat. Hist., 12:575-655). These considerations lead to questions of cause—what are the reasons for the reduction in species richness of Kansas deciduous forest bird communities?

Field data to help answer this question were gathered in June, 1976, by members of the University of Kansas class in Biology 796 working in and near the University's John H. Nelson Experimental Area, in Jefferson County. The experimental area lies on an eroded limestone base, and over the past 50 years has provided a suitable setting for grassland vegetation on ridges and high places, with forest vegetation in ravines and bottomlands. The most important trees of the forest are listed in Table 1. Grassland habitats have Big Bluestem (*Andropogon gerardi*), Little Bluestem (*Schizachyrium scoparius*) and Red Brome (*Bromus rubens*) and edge areas have Rough-leaved Dogwood (*Cornus drummondi*) and saplings of oaks (*Quercus* sp.), elms (*Ulmus* sp.), hickory (*Carya* sp.) and hackberry (*Celtis* sp.).

Forty-five species of birds lived in and near the Nelson Area ravine in the summer of 1976 (Table 2). We obtained quantitative profiles of the vegetation used by each individual; for 33 of the species the data were good enough to use in a statistical summary of structural habitats used that year. The profiles were drawn up using the technique of James (1971, Wilson Bull., 83:215-236), based on the following variables: per cent ground cover, number of shrub stems, number of tree species, per cent canopy cover, canopy height, number of trees 3-6" diameter breast height (DBH), number 6-9" DBH, number 9-12" DBH, number 12-15" DBH, and number more than 15" DBH. These variables were assessed in a space 0.1 acre in area centered on a point defined by the presence of a singing bird, a nest site or a bird seen to take food.

Statistical technique.—The vegetational variables we measured to define bird habitats are related to whether a species of bird was present and to some extent to its abundance. Yet, no single variable accounted for presence or absence of any species. Actually, some combination of all the variables accounted for the composition of the bird community. In order to assess the relative importance to birds of the several variables, these were examined simultaneously by a statistical technique known as principal component (PC) analysis (see Cooley, W. W., and Lohnes, P. R., *Multivariate Data Analysis*, John Wiley and Sons, Inc., 1971). The technique as used here is based on common trends in the variation of the ten variables; a new axis of variation is defined statistically, and it is called "vegetational complexity". Each individual of the bird species providing the original data for the new axis can be projected onto the axis, that is, each can receive a score on the new axis. One advantage to doing this is that, since the new

TABLE 1.—Density, Dominance, and Frequency Data For Trees[1] of The Nelson Tract Ravine, June 1976

Species	Importance	Density Act.	Density Rel.	Dominance Act.	Dominance Rel.	Frequency Act.	Frequency Rel.
Red Oak	61	33	17	3943	31	.09	12
American Ash	49	40	21	425	3	.02	3.4
Chestnut Oak	37	20	10	2193	17	.07	10
Black Walnut	29	18	9	1373	11	.06	9.6
Bur Oak	29	15	8	1558	12	.06	9.6
Shagbark Hickory	28	22	12	497	4	.08	12
Redbud	14	12	6	222	2	.04	6.5
Red Elm	14	11	6	241	2	.04	6.5
Western Hackberry	11	8	4	425	3	.02	3.4
Black Oak	9	4	2	369	3	.02	3.4
Red Mulberry	7	5	3	103	1	.02	3.4
Basswood	6	1	1	516	4	.007	1.1

1 Six species were found to have importance values at or less than 1.6: Honey Locust, American Elm, Western Sycamore, American Hazelnut, Kentucky Coffee Tree, and Buckeye.

TABLE 2.—Relative Abundance of Bird Species In and Near The Nelson Tract Ravine, June 1976

Rank	Species	Pairs	Rank	Species	Pairs
1	Brown-headed Cowbird	33	23	Downy Woodpecker	4
2	Field Sparrow	21	24	Wood Thrush	4
3	Blue Jay	20	25	Grasshopper Sparrow	4
4	Black-capped Chickadee	17	26	Bobwhite	3
5	Tufted Titmouse	16	27	Yellow-breasted Chat	3
6	Cardinal	16	28	Rufous-sided Towhee	3
7	Red-bellied Woodpecker	16	29	Scarlet Tanager	3
8	Yellow-billed Cuckoo	16	30	Red-headed Woodpecker	2
9	Northern Oriole	13	31	Bell Vireo	2
10	Kentucky Warbler	11	32	Blue Grosbeak	2
11	Eastern Meadowlark	10	33	Red-eyed Vireo	2
12	Eastern Wood Pewee	10	34	Red-winged Blackbird	2
13	Mourning Dove	7	35	Eastern Phoebe	2
14	Brown Thrasher	7	36	Yellowthroat	1
15	White-breasted Nuthatch	6	37	Loggerhead Shrike	1
16	Summer Tanager	6	38	Chuck-will's-widow	1
17	Rose-breasted Grosbeak	6	39	Northern Mockingbird	1
18	Dickcissel	6	40	Parula Warbler	1
19	Indigo Bunting	5	41	Red-tailed Hawk	1
20	Crested Flycatcher	5	42	Barred Owl	1
21	Common Grackle	5	43	Great Horned Owl	1
22	American Goldfinch	5	44	Louisiana Waterthrush	1
			45	Carolina Wren	1

axis, PC I, summarizes 63% of the variation in the ten original variables, the score for a species on the new axis has 6.3 times as much information about the habitat of the species as does the raw score on any one of the original variables.

The way in which each of the original variables contributed to the formation of the new, "vegetational complexity" axis is depicted in Figure 1. Each of the 10 variables can be seen to provide a significant amount of information to this new axis (for instance, variable No. 1, per cent ground cover, has a loading of 0.56 on the new axis, and variable No. 3, number of tree species, has a loading of -0.96).

In the same way, another new axis, statistically uncorrelated with the first, can be computed from the remaining variation. This is PC II, which in the present instance summarizes 12% of the variation; PC I and PC II together depict ¾ of the total variation present in the original 10 variables.

Results.—As noted above, each species of bird has a score on each new axis or PC. Therefore, if each species is plotted on the two axes, we will obtain a

representation of how the species was placed in the set of habitats in and near the Nelson area. Figure 2 is such a plot. Each bird species is identified with a four-letter abbreviation and the general configuration of the habitats is suggested by the ink drawings of symbols for grasses, shrubs, and trees. The average score for the Dickcissel (*Spiza americana*) ("Dick") places it as a grassland species; the score for the Wood Thrush (*Hylocichla mustelina*) ("Wdth") is that of a true forest species. Other species likewise are seen to take up positions characteristic of their habitat preferences. Thus, it seems clear that we have obtained a quantitative description of how the birds were distributed in and near the Nelson area in 1976.

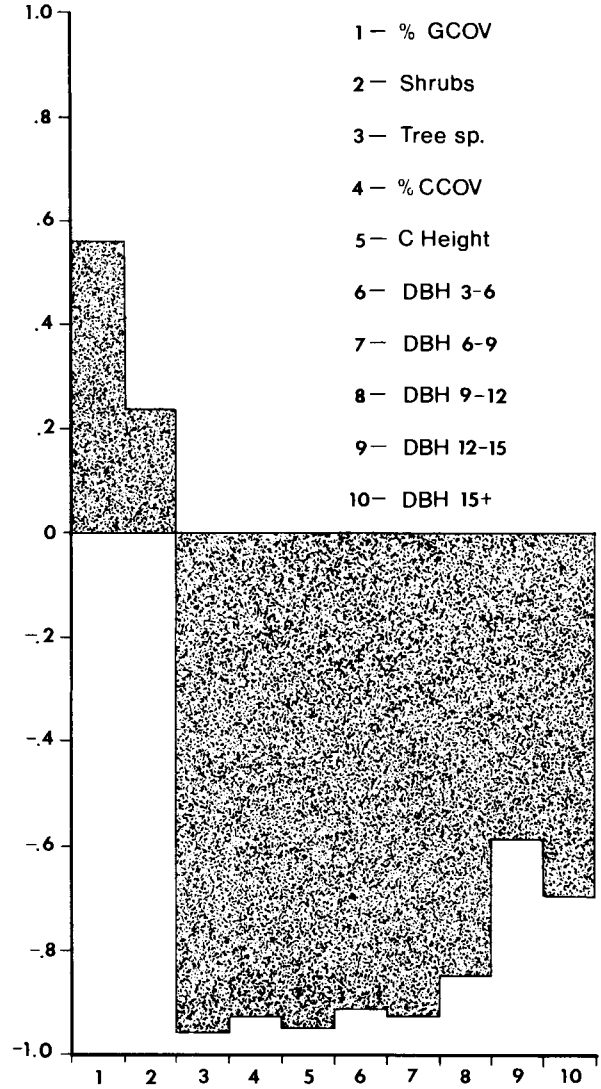

FIGURE 1.—Proportional representation of the ten original variables ("character loadings") on the first principal component of variation, PC I, based on habitat profiles of 33 species of birds occurring on the Nelson Experimental Area in June, 1976. The ten variables are identified and run horizontally; the heights of the stippled histograms show the relative importance of each variable. Ground cover and number of shrub stems vary inversely to the number and height of all size classes of trees, suggesting that PC I can be termed "vegetational complexity."

Accurate description of bird habitats is of course an important thing to have, but it is not the only justification for doing complex statistics on ecological data. A second important consequence is that it may be possible with such an analysis to study why we do not have certain bird species in some forests in eastern Kansas. To illustrate, note that in their recent study of forests in the Fort Leavenworth region, Zimmerman and Tatschl (op cit.) found the Acadian Flycatcher (*Empidonax virescens*), Yellow-throated Vireo (*Vireo flavifrons*), Black-and-white Warbler (*Mniotilta varia*) and American Redstart (*Setophaga ruticilla*) as breeding species. The focus of present concern is, why were those four forest species not present at the Nelson area?

Such a question has three possible answers. First, there may have been inadequate dispersal by these species to the Nelson area. Second, the Nelson wooded area may afford an inadequate habitat for true forest birds. Third, some of the forest birds nesting in the Nelson area may have claimed some resource necessary for the missing species. And, perhaps some combination of these answers approaches the truth.

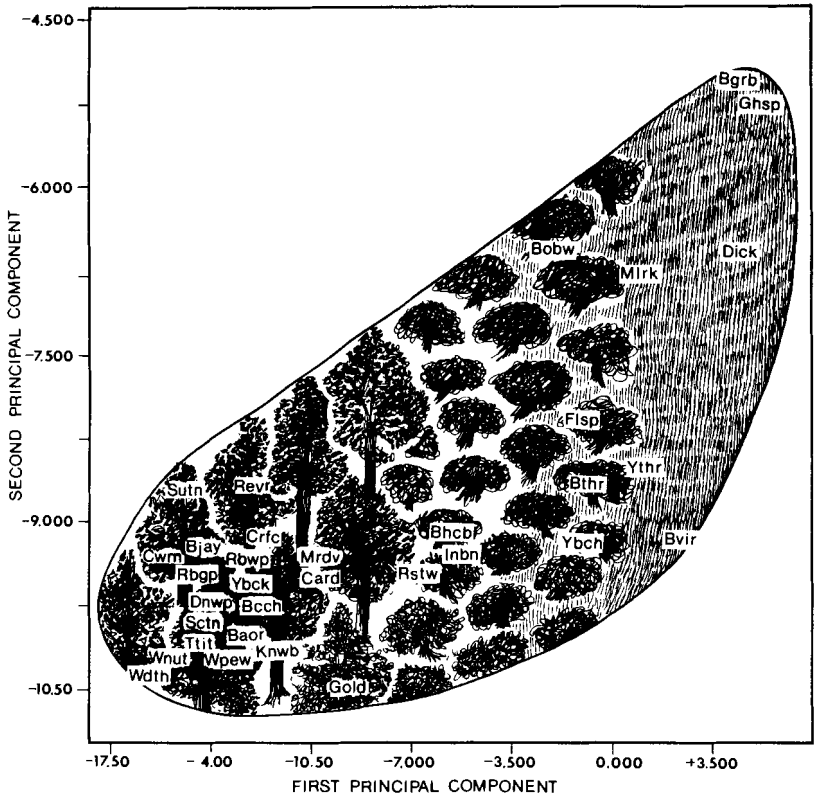

FIGURE 2.—Positions of 33 species of birds in a space defined by principal components I and II of a habitat ordination analysis of the data from the Nelson Experimental Area, June, 1976. The first principal component is "vegetational complexity", the general arrangement of which is suggested by the drawings of grasses, shrubs and trees.

We have no information on dispersal. But, if the answer we seek involves inadequate habitat, we have information. I suppose that the kind of forest including the largest trees that can grow in Kansas is more suitable for deciduous forest birds than is the secondary successional woodland (about 35 to 45 years old) presently in the Nelson area. One way of testing this contention would be to find how much deep forest is actually lacking in the Nelson area. This can be done by

comparing habitat data from more mature forests with the present data from the Nelson area. Data from such a forest in Arkansas was made available by Dr. Frances James. The data base is identical to that of the Nelson area and so the two sets can be directly compared by putting both into another PC analysis.

It is the scores for PC I, vegetational complexity, that are of interest in this comparison. For species in common, scores on PC I for Kansas can be plotted against scores on PC I for Arkansas. Were the forested regions exactly the same, and were the bird species to use them in exactly the same ways, then every species would plot on a line sloping at a 45° angle, as shown in Figure 3. However, the points for most of the species miss the line, and some are far from it. This means either that the forests are not the same in Arkansas and Kansas, or that the birds do not use the habitats in the same way in each region, or both.

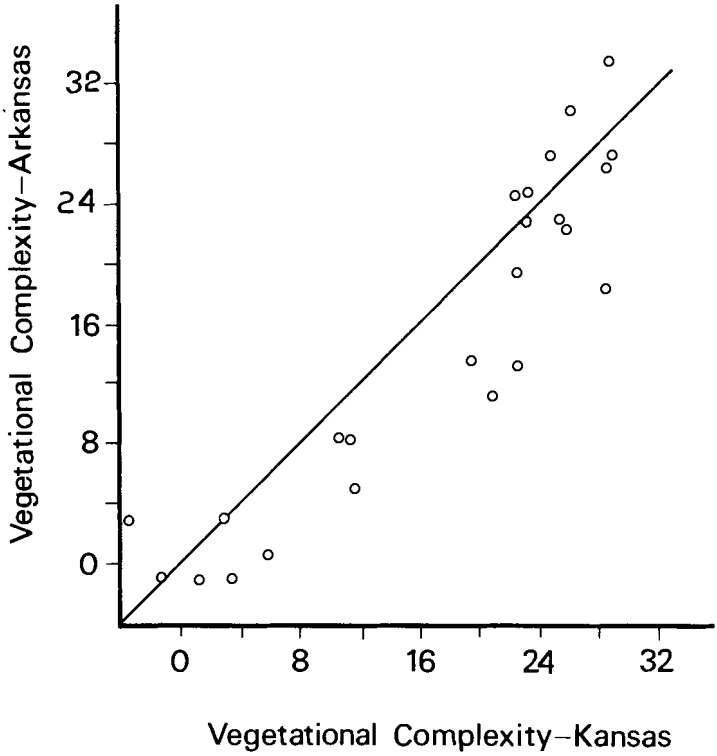

FIGURE 3.—Positions of 24 species of birds in a space defined by "vegetational complexity" (PC I) for both Kansas and Arkansas. If a species has identical scores in both regions its position will be on the line sloping at 45°.

It is important also that the scores for Kansas stop at around 28, but those for Arkansas reach 33. The Nelson area thus lacks more complex aspects of deciduous forest that are found in Arkansas.

If we combine the two important aspects of the Kansas-Arkansas comparisons, we see that some woodland bird species use more complex woodland in Kansas than they do in Arkansas (those points falling below the 45° line in Fig. 3), and that there is less complex woodland available in Kansas than in Arkansas. As a consequence, the Nelson area forest is more crowded with birds than are the Arkansas forests sampled. There are 16 species (14 of which are plotted in Fig. 3) that score 20 points or more in the Kansas forest, and 19 species (16 are plotted in Fig. 3) scoring more than 20 points in Arkansas. The proportion of the Kansas forest available, on the average, to each species is represented by 0.53 point on the vegetational complexity scale, and for Arkansas by 0.71 point. In spite of having

fewer species, the Kansas forest is actually more heavily used by the birds—it has a heavier species-packing than the Arkansas forest.

This analysis suggests that we will have no easy answer to the question of why the Kansas woods lack the Black-and-white Warbler, American Redstart, Acadian Flycatcher and Yellow-throated Vireo. Yet, it seems clear that the combination of heavier species-packing (implying a role for interspecific competition) and successionally immature, less complex forest for the Nelson area is fully capable of reducing the complement of species in the forest bird community.

Acknowledgements: Jim Hamrick was very helpful in setting up the vegetation analysis. Karem Hamrick, Janet Lee, Peter Lowther and John Paul took breeding bird profiles throughout the month of June, 1976. Fran James sent a duplicate Arkansas data deck for our use in this study. Permission to use the Nelson area was obtained from the University of Kansas Field Facilities Committee. My thanks go to all these persons.

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EMLEN TRANSECTS IN KANSAS HABITATS

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The Emlen strip census (Emlen, 1971, 1972) is becoming more and more widely used as a means to measure bird populations, particularly in environmental impact assessment programs. This method has the advantage of being rapid, applicable to a wide variety of habitats, and usable during all seasons of the year. Yet the data produced are only estimates of relative density and hence of minimal value for comparisons between sites and seasons and not usable at all in attempts to determine community biomass densities. Absolute densities can be derived only if empirically determined correction factors (coefficients of detectability) are calculated. Emlen (1971) hypothesized that these coefficients might be species-specific for a given habitat at a given season. If this hypothesis were true and standard coefficients determined, the cost for bird population census work would be decreased and its value in the description of ecological communities would be enhanced.

During January, February and June of 1976 several different bird communities in Kansas were surveyed in an attempt to test Emlen's hypothesis. The results of this work did not support the notion that coefficients of detectability are species-specific in a given habitat during a particular season. Perhaps more data will be required to determine the validity of this hypothesis. Yet the data obtained do add to our understanding of avian communities in Kansas.

METHODS

Transects 1800 feet in length and 300 wide on either side of the centerline and encompassing 10 hectares were set up in a mature hardwood forest habitat and an oldfield community at Ft. Leavenworth, Kansas (Leavenworth Co.), on unburned tall grass prairie at the Konza Prairie Research Natural Area (Geary Co.), and an oldfield community at Ft. Riley, Kansas (Riley Co.). Additionally, a 1800 foot transect 150 feet wide on either side of the centerline (5 hectares) was situated in a cedar woodland near Manhattan, Kansas (Riley Co.). Each area was further divided along the longest axis at 50 and 100 foot intervals parallel to the midline as described by Emlen (1971) so that corrections for detectability due to the distance away from the censusing route could be determined. The transect was consistently covered in a period of 45 to 50 minutes, and all birds seen and-or heard within the census area were recorded and categorized according to the distance from the

midline. An exception to this procedure was made for the summer census in the deciduous forest where only males were recorded and for some of the species in the other habitats censused in the summer (see Table 1).

Winter populations in the Leavenworth mature hardwood forest were based on two censuses conducted in mid-February, while the summer data are based on four censuses completed during the second week of June. The oldfield community at Leavenworth was covered twice in mid-February and three times in the second week of June. The cedar woodland in Riley County was censused twice in early February to obtain winter population data and twice during the first week of June to determine the summer population. Data collection in the Ft. Riley oldfield was made three times during January and twice during the first week of June. The population estimates for the unburned grassland on Konza Prairie are based on three January censuses and two censuses during the first week of June.

The vegetation of the Fort Leavenworth forest has been previously described in detail (Tatschl and Bragg, 1974), while the description of the vegetation in the other habitats is based on line transects across the diagonal of the plot sampled every 50 feet for a total of at least 10 samples. These data were collected during the first half of June. The unburned grassland had an average height of 48 cm and the coverage was 58% grass, 28% forbs, and 14% woody vegetation (n=20). The vegetation in the Leavenworth oldfield averaged 86 cm in height and was composed of 61% forbs, 34% grasses and 5% open (n=21). The Ft. Riley oldfield averaged 52 cm in height with 58% of the coverage in forbs, while the remainder was 29% grass and 13% open (n=14). The cedar woodland was composed of two main strata. The first averaged 42 cm in height with the following coverage: 56% woody, 36% grasses, 2% forbs and 6% open. The upper stratum was 292 cm high with 61% coverage by woody vegetation (cedar) and the remainder was open (n=15).

The species diversity index (H') used is that of Shannon and Weaver (1949) and is given in units based on natural logarithms compiled from the tables of Lloyd, et al. (1968). The measure of equitability used (J') is defined by Pielou (1966) as the species diversity of the community as measured divided by the maximum species diversity possible.

RESULTS AND DISCUSSION

The summer and winter population data are recorded in Table 1 and Table 2 respectively. The species arrangement in these tables is according to habitat and then in the order of decreasing density.

These results conform to the pattern that the diversity of bird populations generally increases with the increasing structural (vegetational) complexity of the habitat (grassland vs. oldfield vs. woodland vs. forest) and is greater in summer than in winter (Kricher, 1972; Tramer, 1969).

Low equitability values occur when the numbers of individuals in the community are unequally divided among the species present. For example, the Tree Sparrows in the Ft. Riley oldfield made up almost 91 percent of the entire winter population, and the equitability value is low. High equitability measures are obtained, on the other hand, when the individuals are more evenly distributed among the species, as in the cedar woodland during the winter. On the basis of these relationships, it has been suggested that communities with higher equitabilities are more stable since the component species are existing in the more tolerable range of their habitat preferenda as evidenced by their generally higher densities. As noted in previous studies (Zimmerman and Tatschl, 1975), equitability increases from winter to summer in the more structural simple habitats like prairie and oldfield.

The same oldfield and mature hardwood forest communities at Ft. Leavenworth were studied in 1973 and 1974 by the detailed mapping of individuals on census areas of 20 and 17 hectares respectively (Zimmerman and Tatschl, 1975). Diversity and equitability values computed for these two habitats by this method are similar to those obtained on these same sites by the present study based on Emlen transect method.

TABLE 1. SUMMER BIRD POPULATIONS (Individuals/hectare)

Species	Unburned Grassland	Leavenworth Oldfield	Ft. Riley Oldfield	Cedar Woodland	Mat. Hardwood Forest [2]
Mourning Dove	1.20	—	0.10	0.70	0.64
Dickcissel[1]	0.80	1.65	2.50	—	—
Eastern Meadowlark	0.35	—	0.25	—	—
Grasshopper Sparrow	0.30	—	—	—	—
Eastern Kingbird	0.22	0.08	0.30	—	—
Brown-headed Cowbird	0.15	0.08	1.15	0.70	1.50
American Goldfinch	0.15	1.92	0.15	—	—
Brown Thrasher	0.15	—	0.65	0.30	—
Loggerhead Shrike	0.15	—	—	—	—
Upland Sandpiper	0.15	—	—	—	—
Common Yellowthroat		5.48[1]	0.40[1]	—	0.15
Red-winged Blackbird		2.48	2.45	—	—
Indigo Bunting		0.75	—	—	2.25
Ruby-throated Hummingbird		0.08	—	—	—
Gray Catbird		0.04	0.25	—	—
Bobwhite[1]			0.30	—	—
Field Sparrow			0.25	1.00	—
Common Grackle			0.22	0.15	—
Orchard Oriole			0.15	—	—
Blue Jay			0.08	0.30	0.40
Red-headed Woodpecker			0.05	—	0.82
Ring-necked Pheasant			0.05	—	—
Cardinal				4.20[1]	1.12
Black-capped Chickadee				0.60	0.58
Tufted Titmouse				0.60	0.75
Common Flicker				0.45	0.40
Great Crested Flycatcher				0.45	0.56
Northern Oriole				0.30	2.32
Bewick's Wren				0.15	—
American Robin				0.15	—
House Wren				0.10	0.05
White-breasted Nuthatch					1.20
Rose-breasted Grosbeak					1.20
Red-bellied Woodpecker					1.12
Red-eyed Vireo					0.68
Downy Woodpecker					0.52
Eastern Wood Pewee					0.49
Yellow-billed Cuckoo					0.45
Starling					0.30
Hairy Woodpecker					0.30
Carolina Wren					0.22
Wood Thrush					0.18
Rufous-sided Towhee					0.15
Northern Parula					0.12
Barred Owl					0.08
Kentucky Warbler					0.06
Scarlet Tanager					0.05
Yellow-throated Vireo					0.04
Total Species	10	9	17	15	30
Total Density (Individuals/hectare)	3.62	12.56	9.30	10.15	37.40[3]
H'	1.96	1.52	2.16	2.12	2.99
J'	0.85	0.69	0.76	0.78	0.88

1 The tabled value is based on the field observations of total males, which then has been doubled to make it comparable to the other figures in the table which are based on counts of both males and females. In the case of the polygynous dickcissel, previous studies have shown that in early June the sex ratio is 1:1.

2 All the values indicated for the density of the birds in the mature deciduous forest are for males only.

3 The total density for the deciduous forest was computed by multiplying the total density of males by 2.

TABLE 2. WINTER BIRD POPULATIONS (Individuals/hectare)

Species	Unburned Grassland	Leavenworth Oldfield	Ft. Riley Oldfield	Cedar Woodland	Mat. Hardwood Forest
Tree Sparrow	1.35	1.65	3.40	0.30	—
Song Sparrow		3.00	—	—	—
Swamp Sparrow		1.80	—	—	—
American Goldfinch		0.90	0.10	0.10	0.90
Downy Woodpecker		0.15	0.02	—	1.80
Marsh Hawk		0.05	—	—	—
Blue Jay			0.15	0.60	0.10
Eastern Meadowlark			0.05	—	—
Ring-necked Pheasant			0.03	—	—
Dark-eyed Junco				0.60	2.40
Cardinal				0.60	1.50
Common Flicker				0.40	0.60
Purple Finch				0.30	—
Black-capped Chickadee				0.30	2.70
Tufted Titmouse					3.00
White-breasted Nuthatch					1.80
Red-bellied Woodpecker					0.90
American Robin					0.30
Starling					0.30
Hairy Woodpecker					0.20
Eastern Bluebird					0.15
Carolina Wren					0.15
Total Density (birds/hectare)	1.35	7.55	3.75	3.20	16.80
Number of species	1	6	6	8	15
H'	0	1.41	0.44	1.98	2.32
J'	0	0.78	0.24	0.95	0.86

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American Woodcock nesting in Douglas County, Kansas.—On 10 April 1977, I flushed an adult American Woodcock (*Philohela minor*) from wet meadow vegetation on the West Campus of The University of Kansas, Lawrence, Kansas. In searching the area from which the bird flew, I found two downy young. The young appeared to be 5-7 days old which would indicate eggs were laid in mid-March.

The adult flew as Bent (1927, U. S. Nat. Mus. Bull. 142:68) described for adults flushed from young: ". . . (the bird) flutters away for a short distance as if hardly able to fly, with dangling legs and tail depressed and spread." The young remained immobile after the adult left, but after I found, examined and released one young, both that one and another nearby gave high pitched, squeaky calls and slowly walked away with wings upraised. The young were 30 g (estimated) and primaries, about 2 cm long, were just beginning to break out of sheaths. This suggests an age of 5-7 days (Pettingill, 1936, Mem. Boston Soc. Nat. Hist. 9:169-391).

The meadow in which the birds were seen is a seepage area supporting mesic vegetation. Aggregations of slough grass (*Spartina pectinata*) with goldenrod (*Solidago sp.*) and of goldenrod with aster (*Aster sp.*) are invaded by many individuals of woody plants. These, often in small sapling stands, include American elm (*Ulmus americana*), wild plum (*Prunus americana*) and a few red cedars (*Juniperus virginiana*). Scrub clumps of prairie rose (*Rosa suffulta*), dogwood (*Cornus drummondii*) and buckbrush (*Symphoricarpos orbitulatus*) also occur. The varying moisture supply caused by slight differences in microtopography combined with the intermittant stream flow promotes a lack of spatial homogeneity in the plant distribution. On dampest sites are cottonwood (*Populus deltoides*) and willow (*Salix sp.*) 4 to 10 m in height. This stream basin is bordered on the east by a bluestem-switch grass (*Andropogon-Panicum*) grassland and on the west by a successional woodland (*Juniperus, Gleditsia, Maclura,* and *Ulmus* in abundance).

This record is apparently the fourth instance of woodcock breeding in Kansas. Cink (1976, Kansas Orn. Soc. Bull. 27:9) described a nest found in Jefferson County. Clubine (1975, Kansas Orn. Soc. Bull. 26:22-23) and Goss (1891, History of the birds of Kansas, Crane Co., Topeka) give accounts of woodcock nesting in Woodson County. Perhaps American Woodcock regularly, though in low numbers, nest in the eastern counties of Kansas, but their secretive habits make the species appear much rarer. This is the first time I have seen woodcock on the West Campus area even though I have regularly banded there since 1973.

I thank C. L. Cink and R. F. Johnston for discussions and comments made in preparation of this paper. C. T. Stahmann provided the vegetation analysis of the area. *Peter E. Lowther, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045.*

A Whooping Crane from the Late Pleistocene of Kansas.—The Late Pleistocene (Wisconsinan) Vanheim Formation in sec. 8, T33S, R27W, Meade County, Kansas, has produced a significant fauna that has been dealt with in at least 25 publications (see Hibbard for a list of references, pp. 395-433 in Pleistocene and Recent Environments of the Central Great Plains, Univ. Press of Kansas, 1970). The fauna from this locality, Kansas University Vertebrate Paleontology (KUVP) collecting locality was termed the Jones Local Fauna by Hibbard (Kansas Acad. Sci. Trans., 43, 1940:417-425). The vertebrates from this fauna include the following mammals: *Sorex cinereus* (masked shrew), *? Sylvilagus* (cottontail rabbit). *Cynomys* sp. (prairie dog), *Spermophilus richardsoni* (ground squirrel), *S. tridecemlineatus* (thirteen-lined ground squirrel), *Geomys bursarius* (pocket gopher), *Perognathus* sp. (pocket mouse), *Onychomys leucogaster* (grasshopper mouse), *Peromyscus* (field mouse), *Pedomys ochrogaster* (prairie vole), *Microtus pennsylvanicus* (meadow vole), *Vulpex velox* (swift fox), *Taxidea taxus* (badger), *Mephitis mephitis* (striped skunk), *Platygonus compressus* (peccary), *Camelops kansanus* (extinct camel), and *Equus* sp. (extinct horse). This fauna is similar to the one presently existing in western Kansas except for the extinct large mammals and its

more boreal aspect. It has been dated by radiocarbon at 26-700 ± 1,500 and 29,000 ± 1,300 years BP.

The birds from the Jones Local Fauna were reported by Downs (*Condor*, 56:207-221, 1954) who listed: *Podiceps caspicus* (Eared Grebe), *Anas* sp. (teal), *A. acuta* (Pintail), *A. clypeata* (Shoveller), *Aythya* sp. (scaup), *Bartramia longicauda* (Upland Plover), *Erolia* (sandpiper), *Zenaidura macroura* (Mourning Dove), ? *Agelaius* (blackbird), ? *Molothrus* (cowbird), *Calamospiza melanocorys* (Lark Bunting), and *Calcarius* (longspur). It is now possible to add to this extensive fauna the first fossil record of a Whooping Crane, *Grus americana*, from Kansas. The fossil, KUVP 5657, is one-half of the coracoidal end of a right scapula. It is as large as the largest Whooping Crane in the KU collection, and bears an oval pneumatic foramen on the ventral surface. The glenoid facet is very large and somewhat more elongate than on the Recent specimens examined; however, the fossil appears to be well within the range of variation for the species. *Grus americana* is also known from Pleistocene sites in California, Idaho, Michigan, Virginia, Florida, and Arizona (Brodkorb, Bull. Fla. State Mus. II, 99-220: 1967; Olson, Condor, 74, 341: 1972). These records indicate that it was widely distributed south of the ice in the Wisconsinan.

Whooping Cranes are presently migrants in Kansas. They breed in northern fresh-water bogs in Canada and winter in the southern United States. During the Wisconsinan their present breeding area would have been under the Continental ice sheet, so it is reasonable to assume that they must have bred further south. Idaho, Michigan and Kansas would have provided habitats similar to those found in the modern breeding range of *Grus americana* and it seems likely that they may have bred in these areas.

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Bobcat predation on nesting Barn Swallows.—On 23 June 1976 a severe storm struck my study area near Hays and on the following morning I found that 9 of the 25 Barn Swallow nests in one of the 6 ft. by 6 ft. concrete culverts were on the floor. Remnants of wings and legs of adult and-or young swallows were associated with four of the fallen. At the time I assumed that the storm had dislodged the nests which had then been visited by a predator, but the presence of adult remains was puzzling. Also, Bobcat (*Lynx rufus*) tracks were found in the soft mud at the entrance of the culvert.

On 26 June an additional 11 nests had been knocked down and again swallow remains were present. I spread sand at both entrances of the culvert in hopes of seeing predator tracks. No tracks or nest predation were found on the 27th or 28th but on 30 June Bobcat tracks were present and another two nests were destroyed. On 6 July I began watching the west culvert entrance between 11:00 and 01:00 hours and from 04:00 to sunrise. Results were negative the first three nights and I missed the fourth but on 10 July at about 04:45 hours I heard a noise from inside the culvert and upon flashing a powerful light into the culvert I saw a Bobcat standing over a nest on the floor. A single swallow was silently flying the length of the culvert. The Bobcat left within moments and I checked the fallen nest which contained three broken eggs with fairly-well developed embryos.

Although I did not continue the night watches, I believe that the Bobcat visited the culvert and knocked down additional nests on the nights of 11, 15, 18 and 26 July. No tracks were observed after that date. A total of 34 nests were involved (21 with eggs, 9 with young, 4 empty) and although a few may have fallen from other causes I feel certain that most were due to Bobcat activity. At least 78 young were killed and 34 eggs broken. All six nests at a second culvert .8 km to the north were dislodged between 11-18 July and again Bobcat tracks were observed. This Bobcat was the major single factor in nest destruction in my study area. Whether the Bobcat "learned" this technique after storms dislodged the first nests remains an unresolved question. *Renne Lohoefener, Fort Hays Kansas State College, Hays 67601.*

Second Specimen of the Vermilion Flycatcher for Kansas.—The first specimen of a Vermilion Flycatcher (*Pyrocephalus rubinus*) from Kansas was reported by C. A. Ely and R. W. Wiley (Kansas Orn. Soc. Bull., 19: 23-24, 1968), who also summarized the few known sightings of that species in Kansas and records from surrounding states. No further such comments are required here.

This note reports the second Kansas specimen, a male, found in Protection, Comanche County, on 4 April 1973. The bird was found dead, along with at least four other "similar" birds, by Krystal DePriest, then 10 years old. There had been heavy snow and a blizzard in the area just prior to her discovery. Krystal took the bird to her teacher, Marie Swisher, who asked her to retrieve the other dead birds; they could not be found, however. Swisher sent the bird to Max C. Thompson for confirmation of her identification. It could be identified but not made into a skin because of its condition. It is now a skeleton (KU 67614) at the University of Kansas Museum of Natural History.

This record is unique inasmuch as the bird apparently was a member of a small flock of Vermilion Flycatchers; all other Kansas records of the species have been of single birds.—*Marion Anne Jenkinson, Museum of Natural History, University of Kansas, Lawrence, 66045.*