



ILLINOIS BIRDS: Laniidae

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CHRISTMAS COUNTS (Illinois Stations)

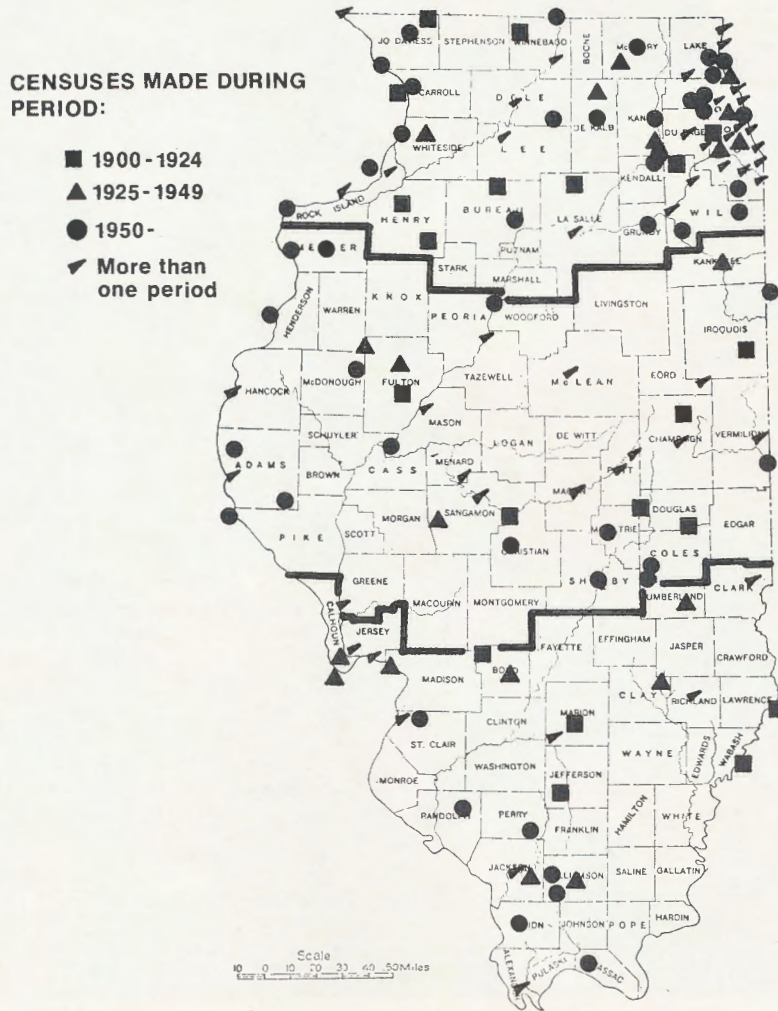


Fig. 1.—Localities in which Audubon Society Christmas counts have been made, and from which data have been used for our reports on Illinois birds. Localities which touch Illinois or its natural boundaries have been included.

ILLINOIS BIRDS: Laniidae

Richard R. Graber, Jean W. Graber, and Ethelyn L. Kirk

THIS PAPER ON THE SHRIKES of Illinois is the fourth in a series intended to summarize the available knowledge on birds of Illinois. The basic goals, procedures, and policies of the project were outlined in the introduction to the first paper (Graber et al. 1970). In the introductions to subsequent papers we have considered in more detail various problems in the interpretation and presentation of data on Illinois birds.

Much of the information presented comes from the literature. Data from this source are so widely dispersed through the thousands of papers published in the past century that they are essentially lost to most students of birds. We estimate that our bibliography on Illinois birds is more than 85 percent complete. The literature available to us is primarily that in the collective libraries of the University of Illinois, including the Illinois Natural History Survey Library, but we are also making use of interlibrary loans to fill in the gaps. The search for published reports continues, and we add worthwhile papers, both old and new, to the bibliography each year. For each family account we try to have the literature coverage current to the time our manuscript is submitted, i.e. usually within a year of the date of publication. An inherent danger of a definitive project of this sort is that students will be overly trusting of our coverage of the literature. We urge all students who use the papers to weigh our summary of the literature against their own knowledge of Illinois birds and the pertinent literature. Corrections of any errors, whether of omission or commission, should either be published separately, or brought to our attention.

For a number of species of birds, including the shrikes, the only semblance of winter population data available for Illinois are those from the National Audubon Society's annual Christmas counts which were started in 1900. We have used data from all of the Illinois census stations and those which touch Illinois or its natural boundaries (Fig. 1), including data published in the (Illinois) Audubon Bulletin and Iowa Bird Life. We have tried various kinds of analyses on the Christmas count data, such as calculations of frequency of occurrence by census, by year and by decade, and calculations of numbers of birds per census, per hour of observation, and per mile traveled.

The limitations in treatment of the Christmas count information are dictated by the rough and incomplete nature of the raw field data. In the case of shrikes, for example, it can be shown that, on the average, more than 600 hours of observation and 8,000 miles of travel have been required for a party of observers to see a northern shrike in central Illinois in winter. When we consider that

the sum of all central Illinois counts, beginning in 1902, did not comprise 600 hours of observation time until the count was in its fourth decade, until about 1935, we can see the serious limitations of the count for studies of long-term population changes, particularly for relatively uncommon species. No calculations, either of frequency of occurrence or population density, can have meaning based on such incomplete coverage.

Besides their poor coverage, the early counts were also short on important collateral data, such as mileage traveled, habitats covered, and weather information. Another drawback of the counts, pointed up particularly well by the shrike data, is the problem of inaccurate identifications. Our analysis (see under species account of the northern shrike) indicates that the two Illinois shrike species have sometimes been confused by students, though not necessarily more so on the Christmas counts than generally in winter.

In important ways the counts have improved in recent decades—more complete coverage, more complete station data, and better informed participants in the counts. Thus, in presenting data from the Christmas counts we tend to emphasize the information for more recent decades, especially since 1940. In general, we have accepted species identifications as given except for instances where the data differ markedly from our personal observations.

In our graphs on the occurrence of shrikes in the Christmas counts we have plotted data as the number of birds seen per 100 party hours of observation (a "party hour" can be defined as an hour of observation time by a group of observers, considered as a single observer). We used hours as the measure of censusing instead of miles traveled, despite the fact that mileage shows better correlation with numbers of shrikes seen ($r = .617$) than do the hour data ($r = .415$). We adopted this course only because some census takers still do not provide mileage data.

It is a pleasure to acknowledge James and Loraine Funk of Liberty, Thomas May of Lenzburg, and Michael Morrison of Sparta for providing valuable information used in this report. Our colleagues William L. Anderson, Ronald Labisky, and James Seets of the Survey made particularly important contributions in the form of field data and specimens. We are also especially indebted to Milton W. Sanderson, of the Survey's Faunistic Section, who patiently identified numerous fragments of insects from the stomachs of shrike specimens. John Unzicker and Wallace LaBerge identified spiders and Hymenoptera specimens for us, and James Appleby and George Godfrey identified the corn borer larvae. Staff members of the Survey's Wildlife Research Office and Editorial Office provided characteristically fine help in the preparation

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and editing of the manuscript, and the preparation of figures and photographs.

LOGGERHEAD SHRIKE (*Lanius ludovicianus*)
(Fig. 2 and 3)

Spring Migration

Two interesting observations by Otto Widmann of St. Louis constitute the sum of knowledge on the diel

timing of migration of the loggerhead shrike. He observed what was apparently diurnal migration — a solitary shrike flying north, out of sight, at 11:00 AM on March 14 (Cooke & Widmann 1884). Seemingly contrary, but not necessarily so, was Widmann's (1922) observation of strong *zugunruhe* (migration restlessness) in a captive shrike every night in October, starting about 9:00 PM. Was this behavior indicative of nocturnal migration?

Though loggerhead shrikes have been recorded in all



Fig. 2. — Loggerhead shrike at its nest (Pope County).

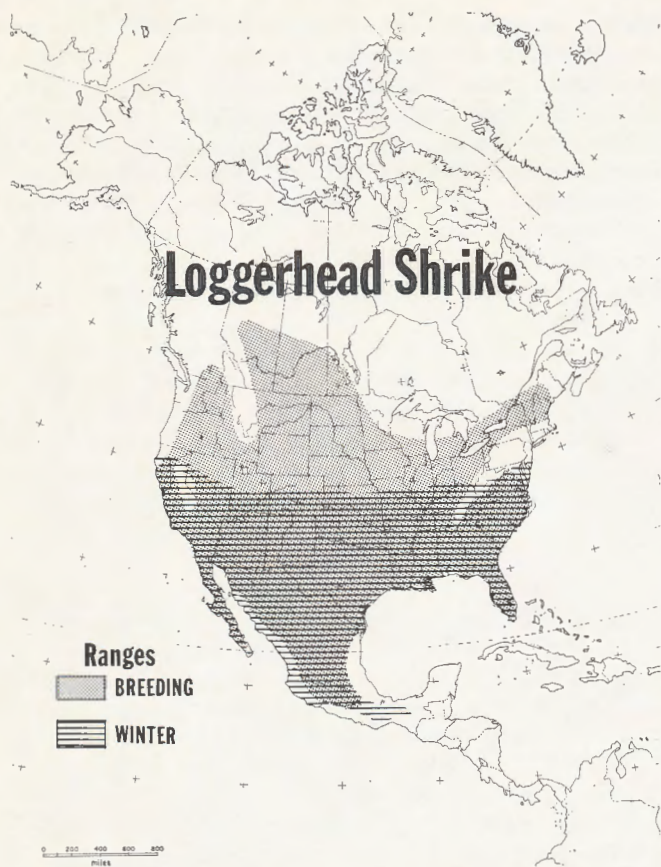


Fig. 3. — General distribution of the loggerhead shrike.

regions of the state in all seasons of the year, there is a detectable spring influx of shrikes, even in southern Illinois, which has a notable winter population (Fig. 4).

Cooke (1888) believed the shrike migration began as early as January 31 in the St. Louis area, though the bulk did not arrive until March 22. Our counts of shrikes for southern Illinois show a marked increase after February 20, and a peak in late March (Fig. 4).

Shrikes were extirpated in central and northern Illinois before our censuses of the migration were made, but older references indicate a spring migration season similar to that in the south. In central Illinois the earliest arrivals have been noted in mid- and late February (DuMont 1947, Musselman 1934–1935, 1938), with more pronounced influxes throughout March, and largest numbers after March 20 (Ekblaw & Ekblaw 1916, Ekblaw 1917, Smith 1917). In the north, February records are exceptional, and there is almost no indication of the migration until March (Bartel & Reuss 1932, Gault 1901). Ford et al. (1934) calculated the average arrival date of the loggerhead shrike to the Chicago area to be March 18, and Ferry (1908) noted that the species became common on March 23.

Distribution

The general distribution of the loggerhead shrike is shown in Fig. 3. The Illinois distribution was never ac-

curately known, and the absence of records in a number of counties (Fig. 5) may be more related to inadequate exploration than to an actual absence of shrikes. We are certain, however, based on extensive searches in the past few years, that most of the population in northern and central Illinois has disappeared since 1965. In this vast area there are probably only a few scattered pairs left. We found only one nest (Mercer County) between 1968 and 1972 after searching large areas of central and northern Illinois. What is left of the state population today is nearly all south of the latitude of Pike and Cumberland counties (Fig. 5).

Nesting Habitats and Populations

Robertson (1942) recorded a shrike nest in oak-hickory forest, but this is exceptional habitat for the species. Most of the nests in Illinois have been recorded in roadside hedges in open country. Ridgway (1887) said the shrike liked open areas with thorn trees, such as the honey locust and wild crabapple.

Most of the nests found in central and northern Illinois have been in osage orange. In the south, nest sites have been much more diversified, though red cedar, rose, and osage orange seemed most favored (Table 1). Ridgway (1887), referring to the south, and Gates (1911) in central Illinois both mentioned the shrike as an orchard bird.

There are also numerous references in the literature to the nesting of shrikes in hedges, but there has been no systematic study as to what truly constitutes shrike habitat, i.e., foraging as well as nesting habitat requirements. Scattered young osage orange trees along the margins of cultivated fields would seem to be loggerhead shrike habitat in its simplest form, but just what and how much of such a combination the shrike uses is unknown.

There have been no measurements of shrike territories in Illinois.

Reports that the shrike population in northern and central Illinois was declining began at least as early as 1910 (Hess 1910, Eifrig 1919, Work 1933, DuMont 1947 and 1947a, Mayfield 1949, Mumford 1960). The reason consistently postulated for the decline was the elimination of hedgerows (Hess 1910, Eifrig 1937, Blocher 1933, Nice 1945, Mayfield 1949). Osage hedges became a prominent feature of the Illinois landscape after 1840, partly due to the vigorous promotion of the plant as a living fence by Jonathan Baldwin Turner (Harkin 1962). With the advent of barbed wire about 1880, removal of the hedges began, and though there are still many fine osage hedges left in the state, they are rapidly being eliminated. There are no records to show what plants were used by nesting shrikes before osage became so prominent, but there are many observations which show that shrikes definitely adopted the new hedges for nesting (op. cit.).

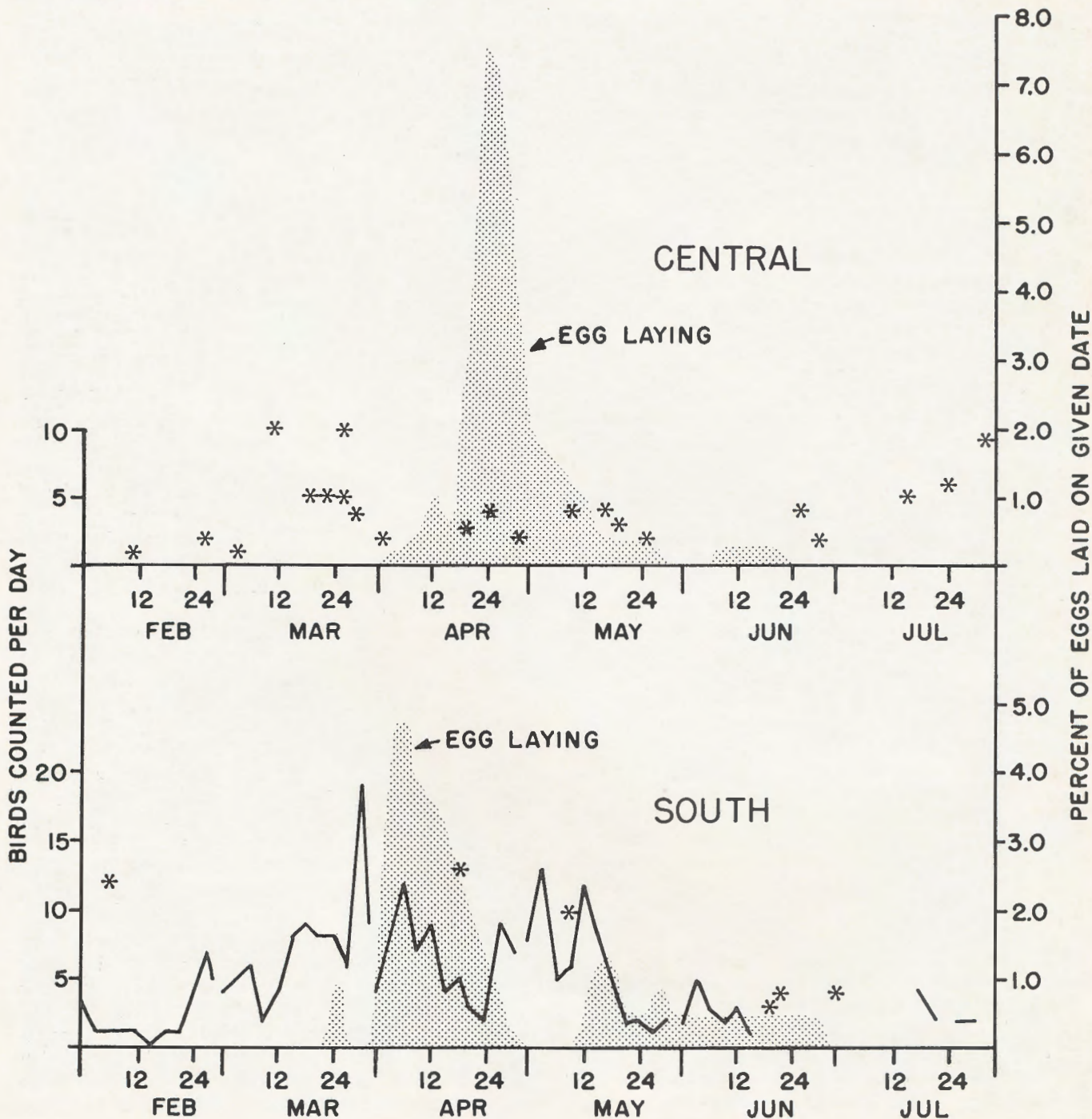
The effect of the osage promotion on the shrike population cannot be assessed for lack of shrike population data. Kennicott (1853–1854) called the loggerhead shrike an abundant species in Illinois, but such a statement

cannot be interpreted numerically. Even in the 20th century when many observers felt that both the shrike population and the hedge population were declining, no one made meaningful measurements to show the change. The earliest reference that could be called even roughly quantitative was Eifrig's (1937) statement: "Formerly a pair [of shrikes] could be seen every two or three miles along the road, now one may drive for days without seeing

one." This statement presumably referred to the Chicago area, where, a few years later, Bartel (1942) recorded two shrikes on a 100-mile road transect made May 26, 1942. Near Springfield, Illinois a much higher count of shrikes was obtained in 1946 (date not given): 35 adult shrikes along a 24-mile stretch of highway (DuMont & Smith 1946).

Despite numerous subjective references to a declining

LOGGERHEAD SHRIKE



shrike population in Illinois, no firm data were collected until the 1950's. In 1957 Ronald F. Labisky of the Illinois Natural History Survey made a record of the number of nesting pairs of shrikes on the roadsides of a 36-square-mile area of agricultural land near Sibley, Illinois (Ford and McLean counties). In succeeding years we continued the survey and witnessed a steady decline of the shrike population until none were left in the area by 1966 (Fig. 6). Our extensive searches elsewhere between 1966 and 1972 revealed that what had happened to the shrike population in the Sibley area also happened over most of northern and central Illinois. Furthermore, the shrike population has declined in much of the Midwest (Mayfield 1949, Petersen 1965, Erdman 1970).

Was this near extirpation related to the decline of hedgerows? In 1958 we measured the roadside hedgerows of the 36-square-mile Sibley study area, and found 5.2 linear miles of hedge. With 10 pairs nesting in the area that year (Fig. 6), the density was 1.9 nests per mile of hedge. By 1959 the hedge declined to 4.8 linear miles, and the number of nests to 8, or 1.7 per mile of hedge. We did not measure the hedges of the study area again until 1972, when there were still 3.7 miles of roadside hedge but no nesting shrikes. There were, in addition, at least 2.8 miles of hedges in the area which were not along roads. In view of the quantity of hedge still left in the area, the disappearance of the shrikes would seem to require some other explanation than just the reduction in hedges. Another change which occurred in the Sibley area during the period when shrikes disappeared was a marked reduction in the acreage of hayfields (William R. Edwards and G. Blair Joselyn, personal communications). We have no data from which to evaluate the effect of this change on the shrike, but it may have been important, depending upon the value of hayfields as foraging habitat for shrikes.

In summary, there apparently were two levels of change in the shrike population of northern and central

Illinois—a relatively slow decline since about 1900, probably related to the removal of hedges in many areas,

LOGGERHEAD SHRIKE BREEDING RECORDS

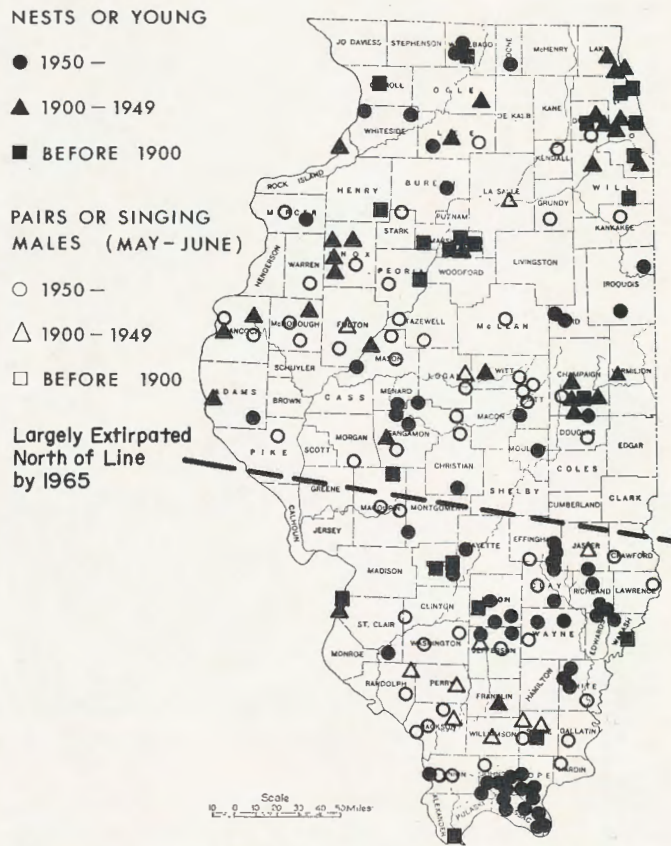


Fig. 5. — Breeding records for the loggerhead shrike in Illinois. Singing male records are for May and June only.

Fig. 4. — (To left and below.) Egg laying and migration seasons of the loggerhead shrike in Illinois. Spring and fall graph lines show the highest daily count of each 3 days (left scale) in southern Illinois, 1967 and 1970. Asterisks represent counts made either in other years or by other observers. Shaded areas show the percent of eggs laid on a given date (right scale).

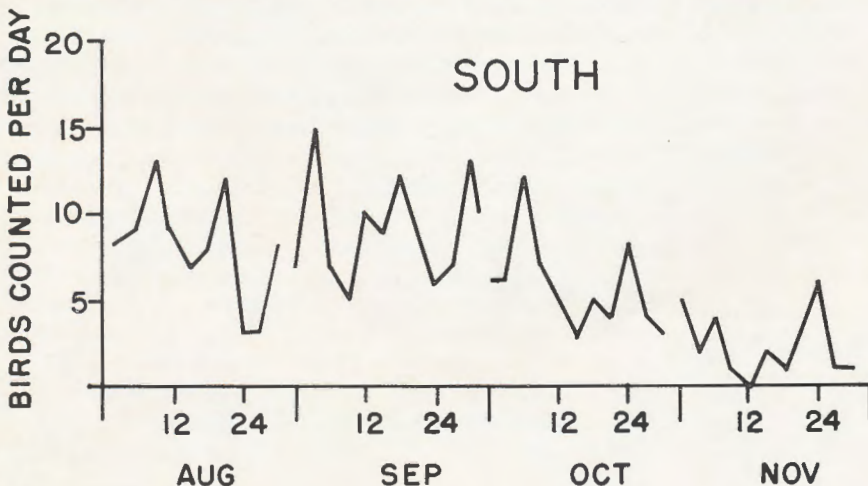


TABLE 1.—Plants used by loggerhead shrikes as nest sites in Illinois.

Species	Percent of Total Nests	
	North and Central (89 Nests)	South (55 Nests)
Osage orange (<i>Maclura pomifera</i>)	88	11
Red cedar (<i>Juniperus virginiana</i>) . . . . .	..	20
Rose (<i>Rosa multiflora</i> and sp.) . . . . .	..	13
Sassafras (<i>Sassafras albidum</i>) . . . . .	..	9
Japanese honeysuckle (<i>Lonicera japonica</i>) . . . . .	..	9
Hawthorn (<i>Crataegus</i> sp.)	3	5
Apple and crabapple (<i>Malus</i> sp.) . . . . .	..	7
Cherry and plum (<i>Prunus serotina</i> and sp.)	2	4
Grape (<i>Vitis</i> sp.)	6	..
Elm (<i>Ulmus</i> sp.) . . . . .	..	5
Pear (<i>Pyrus communis</i>) . . . . .	..	4
Honey locust (<i>Gleditsia triacanthos</i>) . . . . .	..	4
Oak (<i>Quercus</i> sp.) . . . . .	..	2
Greenbrier (<i>Smilax</i> sp.) . . . . .	..	2
Virginia creeper (<i>Parthenocissus quinquefolia</i>) . . . . .	..	2
Pine (<i>Pinus</i> sp.) . . . . .	..	2
Box-elder (<i>Acer negundo</i>) . . . . .	..	2
Poplar (<i>Populus</i> sp.)	1	..

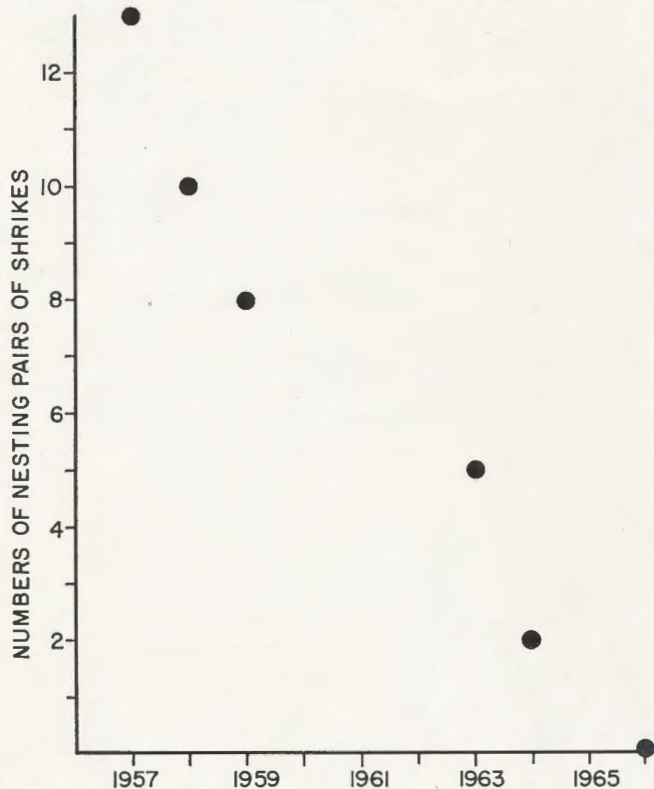


Fig. 6.—Number of pairs of shrikes found nesting on a 36-square mile agricultural area in Ford and McLean counties (east-central Illinois), 1957–1966. Nearly all nests were in osage orange hedges.

and a very rapid decline to near zero between 1957 and 1965 from causes unknown. It is possible, of course, that this change is temporary, but as of 1972 we have seen no sign of recovery by the shrike population.

Nesting Cycle

The song and call notes of the loggerhead shrike are highly varied and interesting, with both sweet notes and (more often) harsh, guttural notes, both somewhat resembling those of the mockingbird (Ridgway 1889). The shrike is not a persistent songster and its vocalizations are not as well known as those of other common species. We have seldom heard the song and have no data on the seasonal periodicity of singing in this species.

Among Illinois songbirds, the loggerhead shrike is an early nester, but Strode's (1918) statement that nesting (in central Illinois) may begin in early March is not literally true. Musselman (1937) observed completely built shrike nests on March 20, 1936 in central Illinois, and even this is probably early for the region. Cooke (1888) believed that shrikes began mating in the St. Louis area the day after they arrived (March 22) from the wintering grounds. During Gault's (unpublished notes) many years of observation in northeastern Illinois the earliest date on which he recorded a completed nest was April 8, while April 16–21 were more typical dates for this stage in the nesting cycle.

The earliest laying dates recorded are March 24 for southern Illinois, April 3 for the central region, and April 15 for the north. The peak in egg production comes in early April in southern Illinois, and in the latter half of April in central Illinois (Fig. 4). There are no comparable data for northern Illinois.

The nests are superficially like thrasher nests, being coarse, bulky structures made of sticks, weed stems, and grass. However, shrike nests are almost always very warmly lined with feathers or fur, or both (Fig. 7, Nehrling 1881, Blocher 1933). There are few records to indicate the time requirement for nest construction by loggerhead shrikes. Gault (unpublished notes, 1902) observed a nest under construction and/or waiting for eggs 11 days in northern Illinois, and in southern Illinois we have recorded nest-building periods of at least 5 days and 7 days, both nests having been partly completed when found. Five nests in central and southern Illinois had incubation periods of 17 days, and the nestling life at two nests in southern Illinois was 16 and 17 days. Thus, the time requirement for one nesting cycle for a nest with six eggs is about 45 days.

Eaton's (1878) statement that the loggerhead shrike rears two broods (northern Illinois) is not borne out by our egg-laying data, at least for the population as a whole. Double-broodedness, if it occurs, is the exception rather than the rule in Illinois.

Most shrike nests in Illinois receive clutches of six eggs, though clutches of seven eggs and five eggs are not uncommon (Table 2, Strode 1918, Hess 1910). In Lee County Blocher (1933a) found the usual clutch to be five



Fig. 7. — Loggerhead shrike nest with eggs in osage orange near Bondville, Illinois, June 17, 1907. Photo by Alfred O. Gross.

eggs. The old oological records show a higher percentage of five-egg clutches in the north than in central and southern Illinois, yet they indicated that even in the north the most frequent clutch size was six eggs. There are no recent data for the north.

The loggerhead shrike has a notably high level of nesting success for a songbird. A sample of 20 nests in roadside hedges (red cedar, rose, sassafras, honeysuckle) of southeastern Illinois in 1967 had a success rate (computed by the exposure day method, Mayfield 1961) of 80 percent (65 percent for eggs). By comparison, brown thrashers nesting in the same hedges had a success rate of only 42 percent of eggs (Graber et al. 1970). In east-

central Illinois between 1958 and 1964, nesting success of shrikes in osage hedges was 71 percent (62 percent for eggs) in a sample of 25 nests. Thrashers in the same hedges had nesting success that varied annually from 34 to 38 percent of the eggs. Nests of thrashers and other species less fierce than shrikes perhaps aid shrike nests by absorbing most of the predation. The causes of failure of shrike nests are apparently unknown. We have never witnessed nest predation, and there is no reference on the subject in the Illinois literature. There are no data on the care of the young or duration of parental care. Young shrikes often remain in or near the nest tree for several days after fledging. Successful nests produced an average of 4.8 young per nest in central Illinois and 4.6 per nest in the south. Based on nesting successes of 71 percent and 80 percent, respectively, productivity at this stage is about 3 to 4 young per breeding pair, yet the fall populations are not particularly high (Fig. 4).

TABLE 2. — Clutch sizes of loggerhead shrikes in Illinois.

Region	Number of Nests	Average Clutch	Percent of Nests by Clutch Size				
			7 Eggs	6 Eggs	5 Eggs	4 Eggs	3 Eggs
North ^a	37	5.9	24	41	35	0	0
Central	72	5.6	10	54	26	8	1
South	25	5.7	4	68	24	4	0

^a The data for northern Illinois are mainly old museum records (around 1900 or before). The central and southern Illinois data are more recent, mainly since 1957.

Fall Migration

The loggerhead shrike populations of northern and central Illinois had virtually disappeared 2 years before we started our censuses of the migration, and our seasonal

counts for those regions were negligible — not more than five birds seen per year.

Blocher (1933, 1933a) noted that shrikes were difficult to find after midsummer, and he put the fall departure before September. Others in northern Illinois made similar observations. In the period 1914–1917, inclusive, Schafer's (1917–1918) "last seen" dates for the loggerhead shrike varied from June 20 to August 16. In many years of observation in DuPage County, Benjamin Gault (1901a and unpublished notes) had very few late summer records for the shrike and his latest record for fall departure of the species was September 1. Ford et al. (1934) gives an average departure date from the Chicago area of September 18, and Oberholser (1918) gives October 3 for the average departure.

Late fall or winter departure dates may be misinterpreted on two accounts: (1) because loggerhead shrikes may occur in the north (rarely) even in winter, and (2) in late fall and winter there is a real possibility of misidentification of shrikes because incoming northern shrikes are very similar in appearance to loggerheads (Fig. 2 and 11). Late departure dates of October 12, November 1, November 11, and November 13 have been recorded for the loggerhead shrike in northern Illinois (Ford et al. 1934, Woodruff 1907, Oberholser 1918, Bent 1950), and November 9 has been recorded for the central region (Musselman 1930).

Apparently the fall migration of this species has never been witnessed, and we can only guess as to when the southward flights begin. In southern Illinois our counts showed a marked increase about the first of August and remained relatively high into October (Fig. 4). Whether the fall counts should be interpreted as productivity or increased conspicuousness of the shrikes for various reasons or as an indication of migration can not be resolved without banding or telemetry studies. The ratio of our spring-to-fall counts (1.0 shrike in spring to 1.5 in fall) is not indicative of the high nesting productivity observed in spring and summer (see under Nesting Cycle). The end of the fall migration is not clearly discernible in southern Illinois because shrikes winter there in good numbers. The counts do fall off abruptly in early October (Fig. 4), and this decline may represent the approximate end of the major fall migration.

Winter Records

Though the loggerhead shrike is a regular winter bird in southern Illinois, and there are some winter records for the species in central and northern Illinois (Fig. 8), there are no published banding data to show whether the winter population is made up of a nonmigratory remnant of the breeding population, late transients or winter immigrants from another breeding population, or some combination of these. The absence of winter records of the loggerhead from large areas of the state (Fig. 8) reflects both the paucity of observers, especially in the southern third of Illinois, where shrikes are relatively com-

LOGGERHEAD SHRIKE Winter Records Dec. 1 - Feb. 1

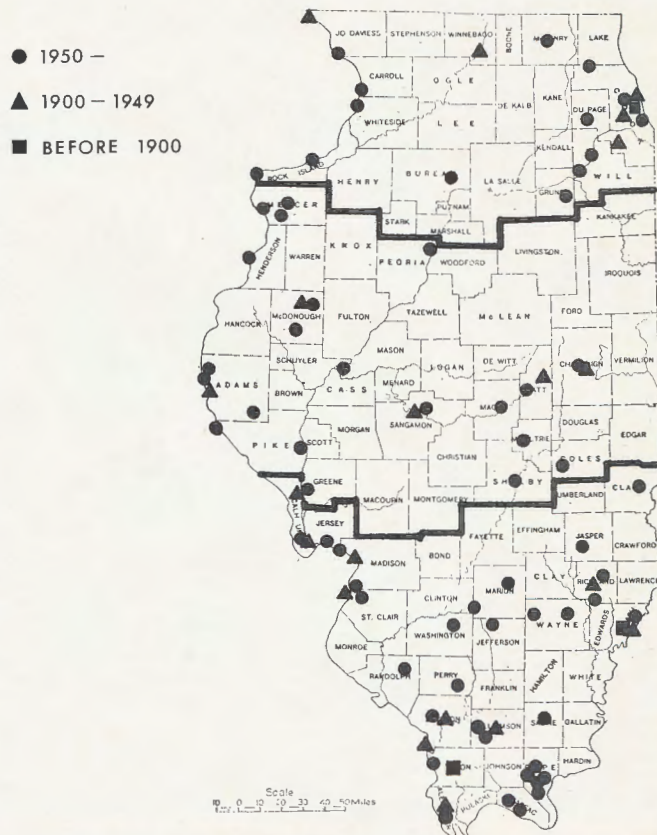


Fig. 8. — Winter records for the loggerhead shrike in Illinois. The three regions of the state discussed in the text are shown by the heavy lines.

mon, and an actual paucity of shrikes in the northern half of the state.

In northern and central Illinois the winter picture of shrike populations is complicated by the erratic occurrence of the northern shrike. Though the two species are distinct biologically, they are, as pointed out in the Fall Migration section above, so similar in appearance that they have been widely confused by bird students from earliest times. The erroneous belief held by some students that winter shrikes were likely to be the northern species has contributed to a number of errors in the Illinois literature, including the Christmas counts, but there is no certain way to separate false records from true. We have, therefore, arbitrarily based our acceptance of identifications on our own (not infallible) observations.

In summarizing the Christmas count data (Fig. 9), we have generally accepted identifications of loggerhead shrikes throughout the state. In the 73-year history of the Christmas count in Illinois, parties of observers have, on the average, required about 8 party hours to find a loggerhead shrike in southern Illinois, 60 hours in central Illinois, and 558 hours in the north. In recent decades

(1951–1971) when mileage data were also provided, observers saw one loggerhead per 40 party miles traveled in southern Illinois, one per 260 miles in central Illinois, and one per 3,000 miles in the northern region (for regions see Fig. 8). The marked fluctuations in winter populations of the loggerhead shrike (Fig. 9) remain to be explained. Musselman (1939) suggested that more shrikes remained in Adams County in “mild years,” but we know of no objective studies on the relationship of shrike populations to climate. The sharp decline of the northern and central Illinois breeding population of shrikes is not observable in the winter population figures, and this observation implies that the winter population may be different from the breeding population. We have noted that extreme west-central Illinois seems to have higher winter populations of loggerheads than other areas

of central Illinois, but better census data are needed to confirm this.

Food Habits

The impaling of prey items in thorn trees, or on barbed wire fences is a well-known habit of shrikes. We once observed a shrike impaling dead birds, small migrants killed in September at a TV tower, on a nearby barbed wire fence. The use and function of the food cache is not fully known or understood (Ridgway 1889).

Depending on the source of information, we obtain two quite different pictures of the shrike’s food habits in Illinois.

Direct field observations of foraging shrikes and of shrike food caches in all regions of the state have indicated that the loggerhead shrike is primarily predaceous

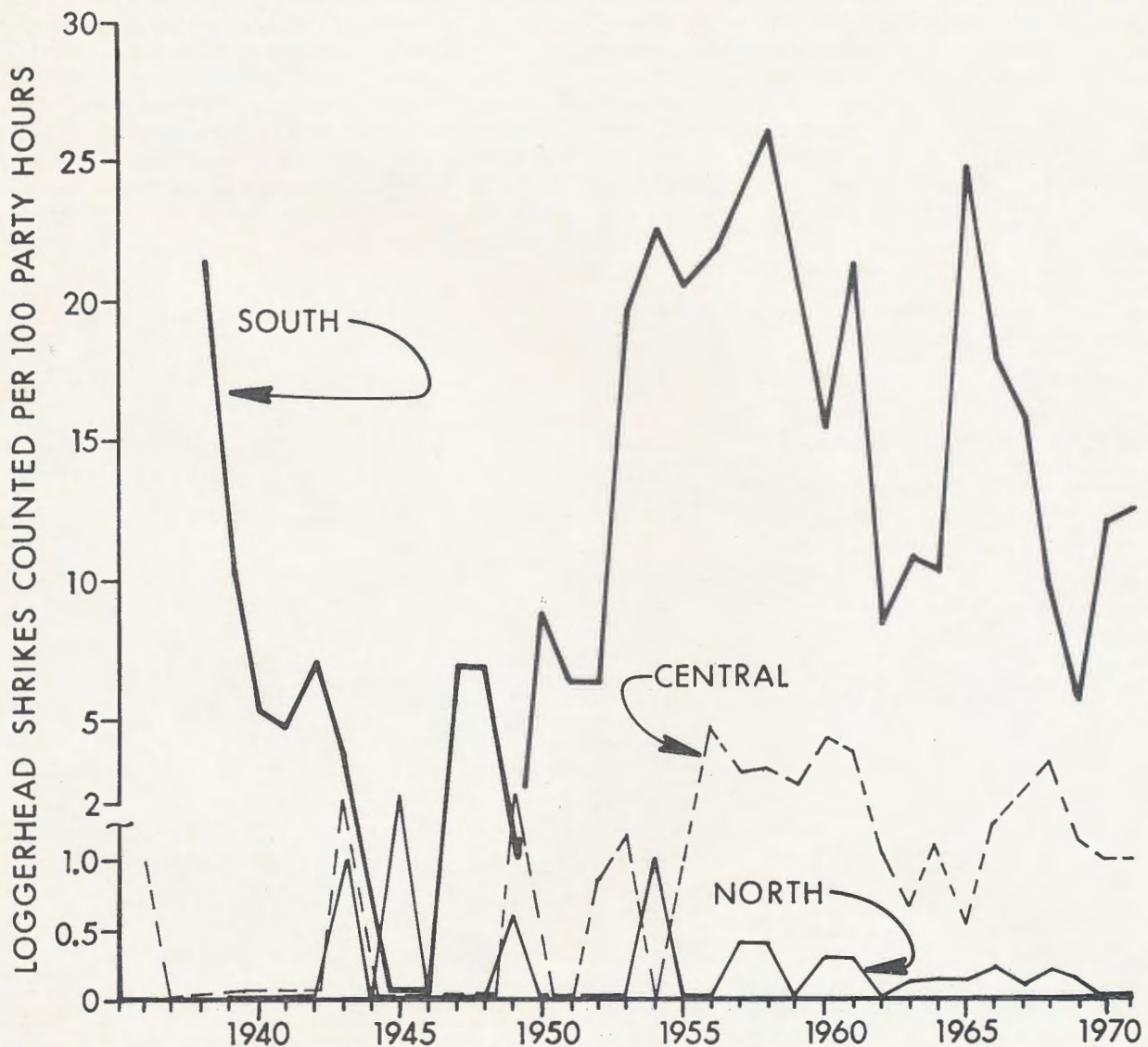


Fig. 9. — Annual variation in winter populations of the loggerhead shrike, based on Audubon Christmas counts in three regions of the state. Graph lines show the number of loggerheads seen per 100 party hours.

on vertebrates, with small mammals (probably mainly *Microtus* and *Peromyscus*) predominating (Nearing 1961, Smith 1921, Breemfield 1921, Strode 1918). Songbirds have also been considered important prey. House sparrows (*Passer domesticus*) have been most often mentioned, but also juncos (*Junco hyemalis*), vesper sparrow (*Pooecetes gramineus*), Henslow's sparrow (*Passerherbulus henslowii*), field sparrow (*Spizella pusilla*), bluebird (*Sialia sialis*), horned lark (*Eremophila alpestris*), and downy woodpecker (*Dendrocopos pubescens*) (Farwell 1919, Miller 1935, Strumberg 1883, Vandercook 1921, Schafer 1921, and Woodruff 1897). Snakes, particularly garter snakes (*Thamnophis sirtalis*), and small frogs are frequently found in the food caches (Nearing 1961, Woodruff 1897), and the most commonly mentioned invertebrate in the caches are short-horned grasshoppers (Vandercook 1921, Vestal 1913, Ridgway 1889). We have seen a number of summer food caches in southern Illinois which consisted of only one or two items, always including either a vole (*Microtus*) or a house sparrow or both. One cache which we found on a barbed wire fence in late April in Johnson County, however, contained a bird skull (*Passer?*), three small frogs (*Acris crepitans*), a small garter snake (*Thamnophis*), two beetles (*Scarabaeidae*), and a moth, plus four regurgitated pellets, one of which we saw a shrike pin on the fence along with the other items.

Examination of the stomachs of a number of shrikes (62 adults and 9 stub-tailed juveniles) collected in southern Illinois indicates food habits different from the above (Table 3). The stomachs did contain numbers of grasshoppers (*Acrididae*), as expected from the field observations, but more dominant food items were ground beetles (*Carabidae*) and caterpillars, with vertebrates being much less frequent (Table 3). Many of the ground beetles were small, which suggests that shrikes forage a lot on the ground. Many of the caterpillars were European corn borers (*Ostrinia nubilalis*) which overwinter in cornstalks. How the shrikes get these insects is not known. There was no marked difference in adult and juvenile stomach contents. Though there are some interesting seasonal variations, e.g. the increased consumption of grasshoppers and Hymenoptera in late summer and fall, the consistent quality of the diet is even more impressive than the variations. Is the loggerhead shrike more dependent upon beetles and caterpillars than upon vertebrate prey for sustenance? From the present data we cannot say, and more systematic studies are required.

The food data do indicate the versatility of shrikes in foraging. Cleland (1922) and Breemfield (1921) observed shrikes catching prey by following farmers discing their fields. In describing predation by shrikes on house sparrows, Larsen (1897) observed that the shrike relentlessly chased a sparrow until it tired. In catching grasshoppers,

TABLE 3.—Stomach contents of loggerhead shrikes collected in southern Illinois, 1971–1972.

Food Item	January		April		July		September-October	
	Percent of all Items	Percent Frequency of Occurrence (10 spec.)	Percent of all Items	Percent Frequency of Occurrence (31 spec.)	Percent of all Items	Percent Frequency of Occurrence (20 spec.)	Percent of all Items	Percent Frequency of Occurrence (10 spec.)
Diplopoda	1.1	10	1.0	6	0.9	5	..	..
Insects								
(Unspecified)	2.2	10	..	..	..	..	..	..
Orthoptera (grasshoppers)	11.2	40	5.2	19	29.3	65	29.4	60
Hemiptera (stink bugs)	1.1	10	0.5	3	0.9	5	..	..
Coleoptera (unspecified)	6.7	20	3.1	13	2.6	5	..	..
Carabidae (ground beetles)	18.0	60	51.1	84	25.0	65	14.7	40
Silphidae (carrion beetles)	..	..	..	..	2.6	5	..	..
Elateridae (wire worms)	..	..	0.5	3	..	..	..	..
Scarabaeidae (<i>Anomala</i> , dung beetles)	..	..	5.7	13	3.4	15	..	..
Cerambycidae (<i>Megacyllene</i>)	..	..	2.6	13	2.6	10	8.8	30
Curculionidae (snout beetles)	2.2	20	..	..	..	..	..	..
Lepidoptera (caterpillars only)	46.1	70	22.3	45	9.5	40	29.4	70
Hymenoptera (winged ants, wasps)	..	..	1.0	3	21.5	15	11.8	30
Arachnida (wolf spiders)	6.7	30	2.1	10	1.7	10	..	..
Vertebrates								
Small birds	1.1	10	0.5	3	..	..	..	..
Small mammals (<i>Microtus</i> , <i>Peromyscus</i>)	3.4	30	4.2	26	..	..	5.9	20
Plant material (twigs, grass)	..	10	..	..	..	5	..	..
Grit	..	..	..	..	..	5	..	..
Totals	99.8	..	99.8	..	100.0	..	100.0	..

and presumably other insects and mice, the shrike often hovers a few feet above ground, then drops on its prey (Vandercook 1921). Shrikes also drop on prey from an elevated perch.

Specimen Data

There are many references in the Illinois literature to the occurrence of "white-rumped" shrikes in the state (Larsen 1897, Ridgway 1878, Loucks 1891, Gault 1899, Blocher 1934). The identification of the Illinois breeding population was clarified by Ridgway (1889), and more fully by Miller (1931) who observed that though some Illinois specimens showed intergradation toward the western race *excubitorides*, the Illinois population is properly allocated to *Lanius ludovicianus migrans*. An

excellent series of 75 specimens, including many known nesting birds in the Survey collection, helps to verify the identification. Males appear more variable in color than females and about 20 percent of the males show some characters of the western form, but none are truly representative of *excubitorides*.

We have examined only 14 winter specimens, all *migrans*. The possibility of a winter influx of western shrikes exists, particularly to the western edge of the state, but identification of the western population depends on the collection of specimens. There are no consistent size differences between the sexes (Table 4). Winter specimens (in the hand, at least) can be sexed consistently on the basis of the gray vermiculations on the breast of females, males being much more nearly immaculate on the breast (Fig. 10). Wear reduces the difference

TABLE 4. — Weights and measurements of loggerhead shrikes collected in southern Illinois, 1971–1972.

Age and Sex	Months	Number of Specimens	Gross Weight (grams)		Wing Chord (mm)		Tail Length (mm)	
			Range	Mean	Range	Mean	Range	Mean
Adult male	Jan.	4	54.2–64.7	58.5	96.4–99.4	97.8	92.0–96.5	94.1
	April	17	47.9–57.9	53.0	92.7–101.8	98.7	88.6–101.4	95.5
	July	4	45.2–56.1	50.9	99.0–100.8	99.4	(badly worn)	
	Sept.-Oct.	8	51.9–57.3	54.4	(moulting)			
Adult female	Jan.	7	46.8–57.0	53.5	93.8–102.2	97.8	90.1–99.2	94.6
	April	16	50.9–74.3	61.1	93.3–98.2	95.6	89.2–99.5	93.1
	July	7	46.8–55.0	50.9	91.2–97.0	94.2	91.2–97.0	94.2

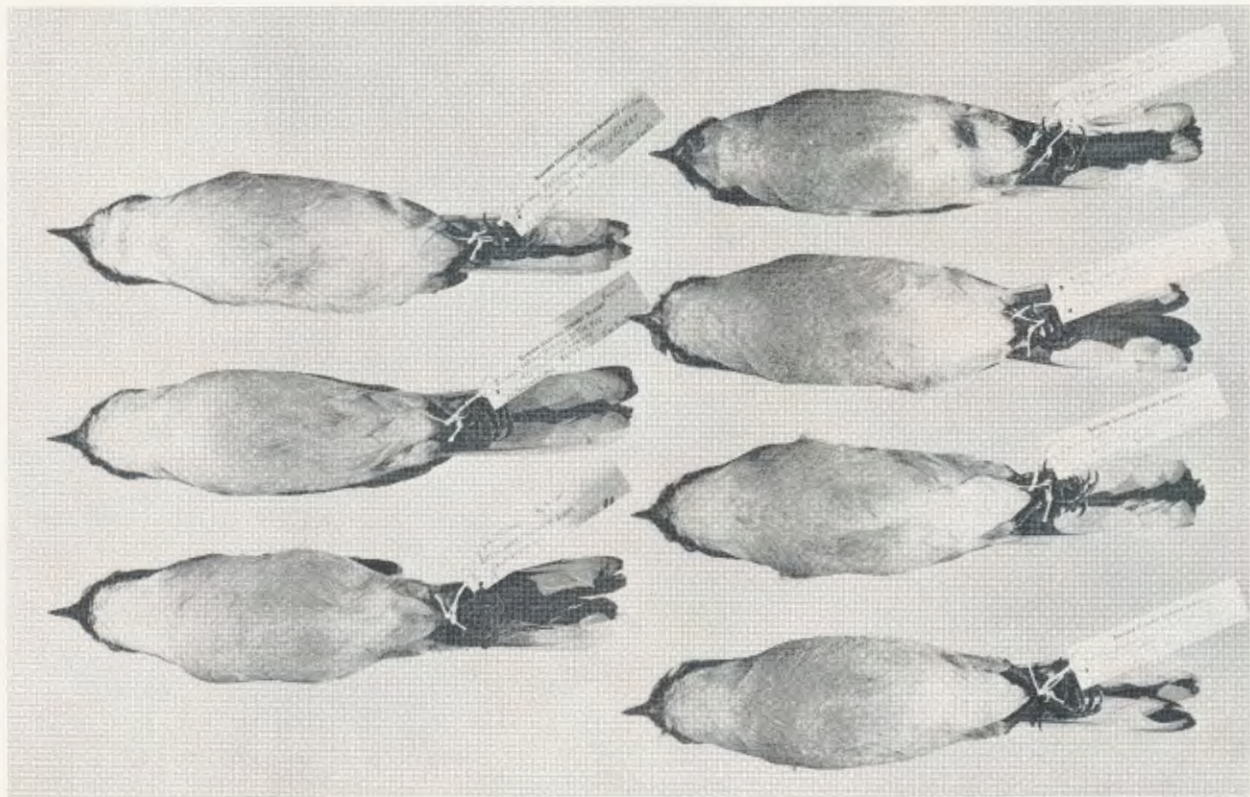


Fig. 10. — Sexual dimorphism in winter specimens of loggerhead shrikes. Females (right side) show more vermiculations on breast.

considerably by April. July specimens are badly worn and some, including adults, show the beginning of the molt. The molt appears to be prolonged, as all September and early October specimens are still in heavy molt.

NORTHERN SHRIKE (*Lanius excubitor*)
(Fig. 11 and 12)

The northern shrike is primarily a winter visitant to Illinois, and though there are numerous records for the species (Fig. 13) there are relatively few collected specimens. Because of the marked similarity between the

northern shrike and the loggerhead (Fig. 2 and 11), sight records of the northern species in Illinois are always subject to question as, by the same token, are winter records of the loggerhead in the northern half of the state. There is no way to determine the validity of most of the published winter records of shrikes in northern Illinois, and discussion of the distribution (Fig. 13) is problematical. The two species are identifiable with care, however, and we have generally accepted shrike records (as given) for northern Illinois as well as for central Illinois from observers with considerable field experience. On the other hand, we have found no

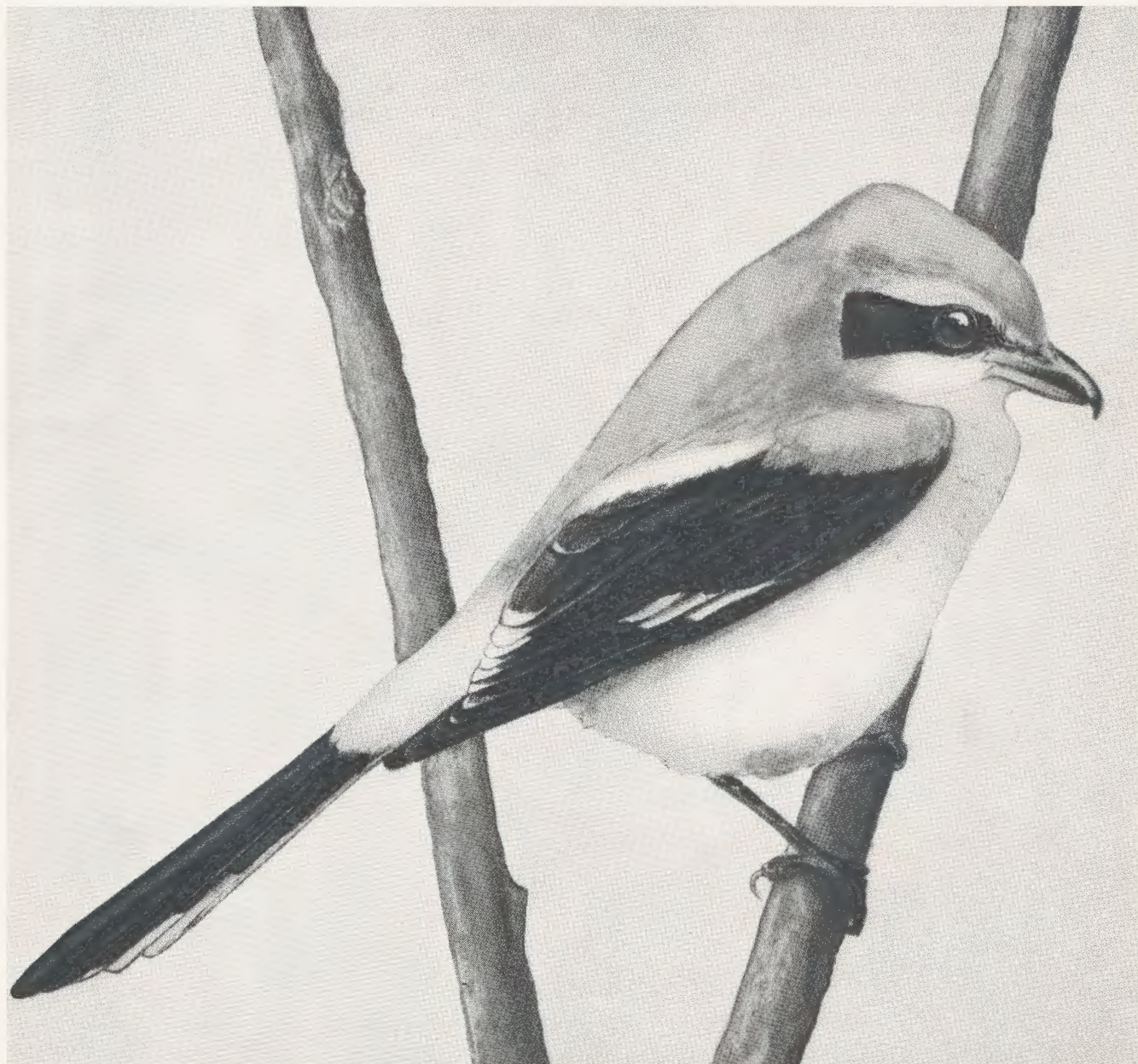


Fig. 11. — Northern shrike. This species is slightly larger and paler gray than the loggerhead, with less black on the forehead, a yellowish, vs. black, mandible, and a stronger bill. Most Illinois specimens have very faint vermiculations on the breast, but some plumages and populations of the northern shrike are more heavily vermiculated than the specimen shown.

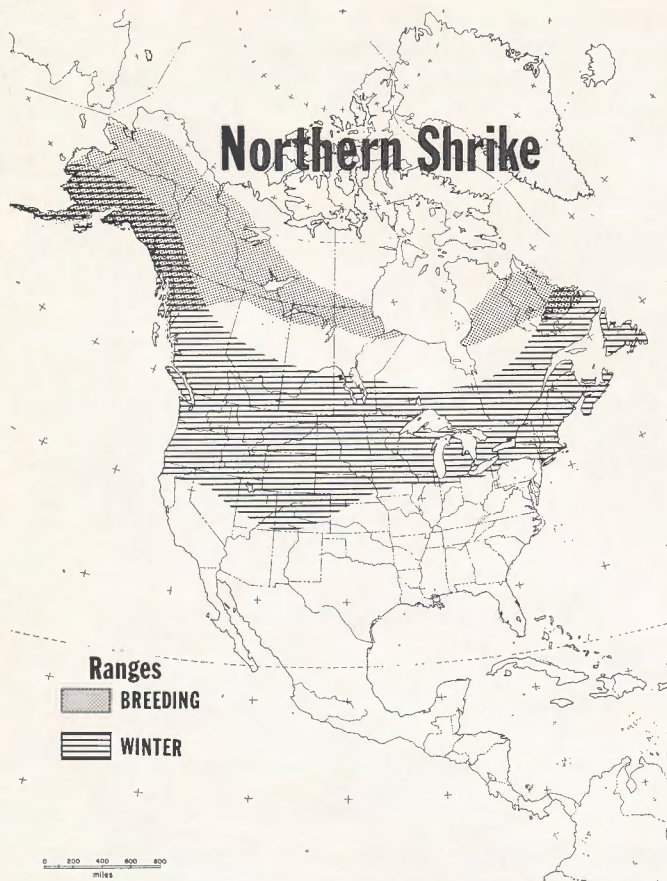


Fig. 12.—North American distribution of the northern shrike. The species is also widely distributed in the Old World.

certain proof of the occurrence of the northern shrike in the southern Illinois area, despite the number of published reports to the contrary (Hurter 1884, Widmann 1907 and 1922, Comfort 1941, and Christmas counts for 1940, 1949, 1950, 1955, 1958, 1960, 1962, 1965). Hurter (1884) implies the existence of a specimen taken in the St. Louis area, but we have not located it. In the absence of specimens, photographs, or other very carefully documented records, we have discounted all reports of the northern shrike for the southern half of Illinois (Fig. 13).

The seasonal distribution of the northern shrike in Illinois is just as problematical as the geographic distribution. Published records for the state run from October 12 to April 16 (Ferry 1907, Bartel & Reuss 1932). We plotted most of the northern shrike records for Illinois by date (Fig. 14), and found that the records were fairly uniformly distributed from October 20 through March, except for three definite peaks—in late October, late March, and during the Christmas count period. The Christmas peak probably mainly reflects the increased interest and coverage of observers preparing for and/or conducting censuses. The late October and March peaks coincide suspiciously with the fall and spring migrations of the loggerhead shrike in Illinois (Fig. 4 and 14). It is, of course, possible that these are periods of increased numbers for the northern shrike as well, or periods of

NORTHERN SHRIKE Winter Records (mainly)

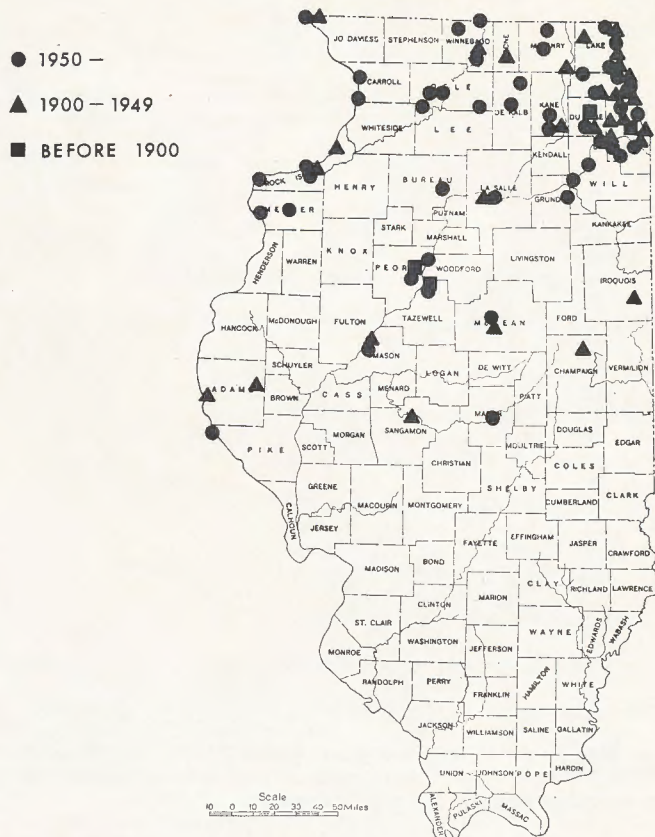


Fig. 13.—Northern shrike records for Illinois. A number of published records, especially for southern Illinois, were unacceptable, and not plotted. Most, but not all, of the records are for the cold months (November-February).

increased observer activity. Some observers state that there is a definite influx of northern shrikes in December (Nolan 1955, Petersen 1954), and the Christmas peak may thus be more than just increased observer activity, i.e., related directly to the biology of the northern shrike.

Though the Christmas count data are crude, they comprise the only semblance of population data for the northern shrike in Illinois (Fig. 15). Over the 73-year history of the Christmas count, observers in northern Illinois have seen northern shrikes at the rate of about one per 140 party hours of observation versus about 560 hours per loggerhead shrike. In central Illinois the rate was one northern shrike per 680 party hours, versus only 60 hours per loggerhead. For the more recent years (1951-1970) when relatively complete mileage data were provided for the counts, observers saw one northern shrike per 800 party miles traveled in northern Illinois, and one per 8,000 miles in the central region.

In recent decades northern shrikes have been reported every year in northern Illinois, but only about one year in three in the central region (Fig. 15). Even in northern Illinois the population shows marked annual

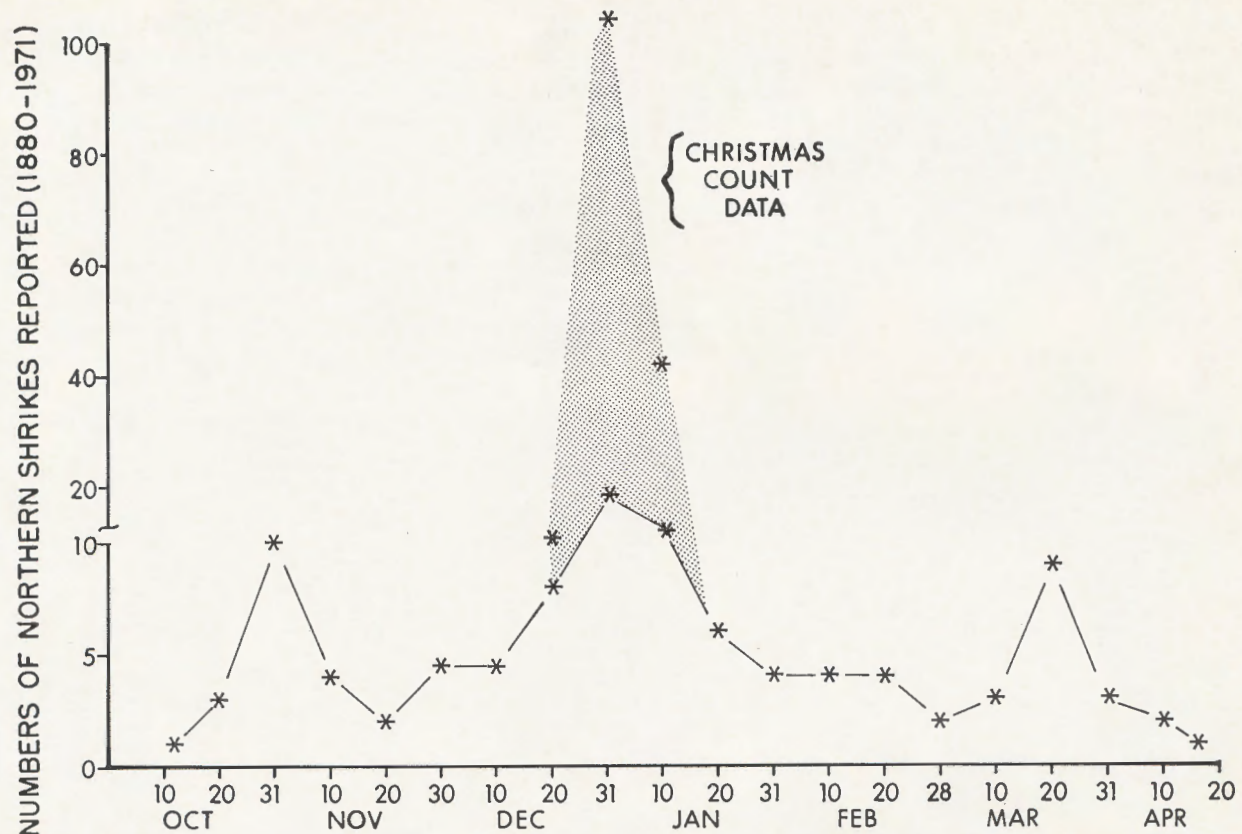


Fig. 14. — Illinois records for the northern shrike plotted by date. The asterisks represent the cumulative number of northern shrikes seen for each 10-day (approximate) interval — October 1-10, 11-20, 21-31 — for the years 1880-1971 inclusive. The shaded area represents data from the Christmas counts.

* = Northern Shrike - Central

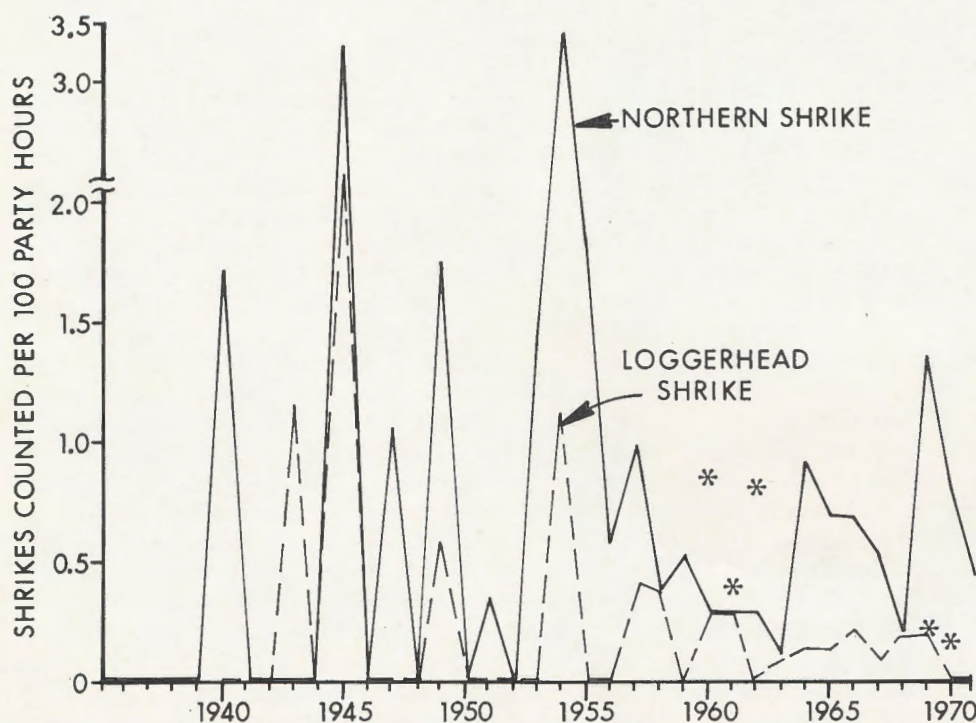


Fig. 15. — Annual variation in winter populations of the northern and loggerhead shrikes, based on Audubon Christmas counts in northern and central Illinois. Graph lines show the number of northern and loggerhead shrikes seen per 100 party hours in northern Illinois. Asterisks show northern shrike populations in central Illinois for years when the species was recorded. Zero counts, i.e. most years, were not plotted for the central regions.

variation, and we can see no consistent pattern to the variation (Fig. 15), i.e., peak invasions do not appear to be predictable. Essentially nothing is known of the causes of northern shrike immigrations, or of the biology of the species in Illinois.

All references to the food of the northern shrike in Illinois concern only one type of prey, several species of birds, most notably juncos and house sparrows (Sanborn 1921, Ekblaw 1920, Mayfield 1950, Gault unpublished notes 1898). Burtis Wilson's notes (up to 1904) on the Davenport, Iowa area related that northern shrikes had frequently come into the city to catch sparrows in earlier years (pre-1900), but later were rarely seen (Hodges 1954). Northern shrikes have occasionally proved annoying to bird banders by entering their traps to kill birds (Sanborn 1921, 1922). Lyon (1930) often killed shrikes for this reason. Like loggerheads, northern shrikes have the habit of impaling their prey in thorn trees (Schafer 1921, Ferry 1907).

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