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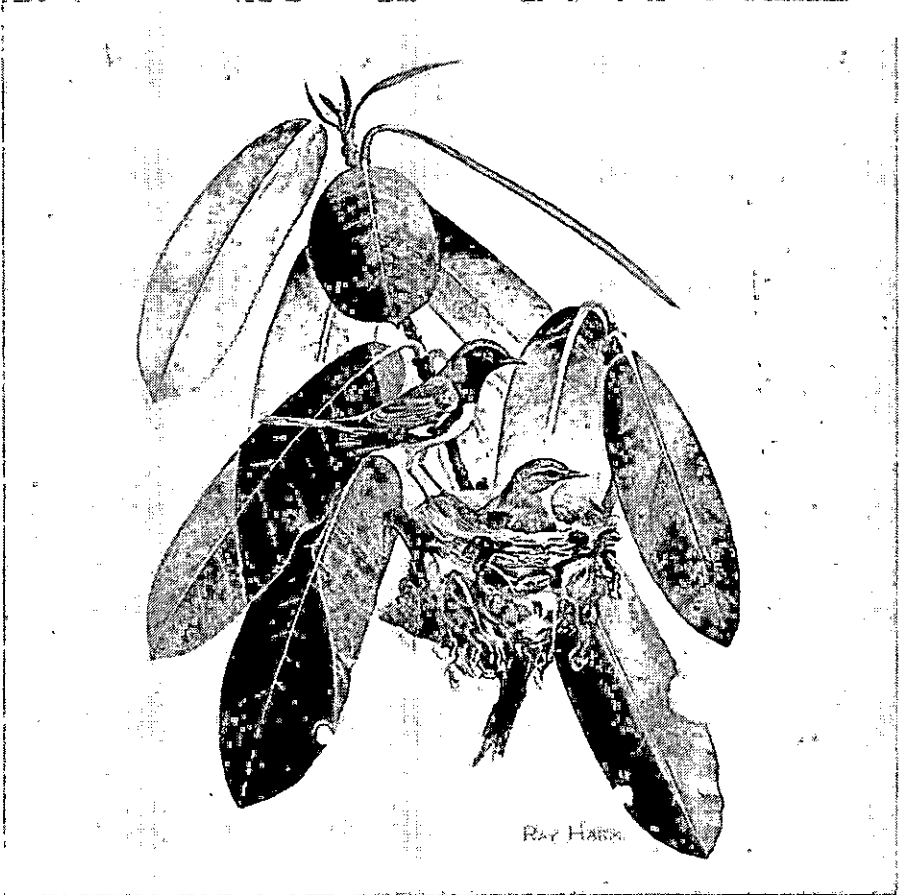
The Kentucky Warbler

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OUR COVER

The ability of our gifted staff artist, Ray Harm, is once again displayed in his painting of the Black-throated Blue Warblers.

BREEDING BIOLOGY OF THE STARLING IN KENTUCKY

DANIEL J. TWEDT AND ROBERT S. ODDO

The European Starling (*Sturnus vulgaris*) was introduced into North America near New York City about 1890 (Pearson 1917). Once established, the Starling's range expanded rapidly, and it now breeds ubiquitously over most of the United States and southern Canada. The Starling was first reported breeding in Kentucky near Lexington in 1919 (Dodge 1951), and was reported nesting near Bowling Green by 1930 (Wilson 1930).

Studies on the breeding biology of Starlings in North America have been conducted at several locations including: Arizona (Royall 1966), Colorado (DeHaven and Guarino 1970) and Ontario (Collins and DeVos 1966). The most definitive study was conducted by Kessel (1957) near Ithaca, New York. These four studies will be referred to in the text by location.

Information concerning the breeding biology of the Starling in Kentucky is sparse. In the only known detailed study of the breeding biology of Starlings in Kentucky, Lovell (1942) reported on the development of one brood reared in Louisville. The intent of our study was to obtain data on Starlings breeding in Kentucky for comparison with Starling breeding data in other areas of North America.

MATERIALS AND METHODS

In March 1981, 125 nest boxes were erected at the Western Kentucky University (WKU) Farm near Bowling Green, Kentucky. Nest boxes were made of 6 mm exterior grade plywood, inside dimensions were 19 x 20 x 25 cm, the entrance hole was 5 cm in diameter, and access for observations and banding was provided by a hinged roof. Boxes were nailed to trees, poles, or fence posts in pastures, crop fields, or hedgerows at a height of 1.5 to 3 m and no less than 7 m between boxes.

From 1 April through 1 July 1981, 62 randomly selected boxes were visited a minimum of three times per week. To determine the impact of observer visitation, the remaining 63 boxes were visited intermittently (about every 2 weeks) to determine usage of the box and to band the young. Additionally, from 11 April through 28 June 1983, the 91 intact nest boxes remaining at the WKU Farm were visited weekly. Because of other commitments in spring 1982, nest boxes were visited irregularly and infrequently. Although Starling young were banded in 1982, data collected were insufficient to warrant inclusion in this paper. Data on nest building, number of eggs, and number of nestlings were recorded during each visit. Nestlings were banded when 7 days old or older. Weather data for the nesting seasons were obtained from the Department of Geology and Geography, WKU.

RESULTS AND DISCUSSION

Nest Building

Nesting activity was apparent around many of the nest boxes almost immediately after their placement in late March 1981. Initially, "green" plant material (grasses, forbs, and flowers) was found in many of these boxes. Kessel (1957) reported that male Starlings deposit this material in nest boxes during courtship. Nest construction appeared to be weather

dependent; clear and warm conditions were conducive to intensive nest construction, whereas inclement weather inhibited nest building.

Of the 62 boxes regularly visited in 1981, 47 (76%) contained some type of nesting material. However, only 28 accumulated sufficient nesting material to be subjectively considered a "completed nest". In 1983, 56 of the 91 boxes visited contained nesting material and of these 50 were considered completed nests.

Starlings appeared to prefer nest boxes affixed to isolated trees or poles, or located on the edge of discrete, small, wooded areas within pastures. Starlings tended to avoid nest boxes located on the edge of larger more heavily wooded areas, and dense overgrown hedgerows. Squirrel damage to nest boxes along the edge of woods was widespread and may have contributed to Starling avoidance. Starlings also appeared less likely to use nest boxes associated with cropland such as corn or wheat.

Egg-Laying

Day length is the principal environmental factor timing gametogenesis in the Starling (Burger 1939). However, egg-laying dates for local regions are also affected by temperature. In New York, Kessel (1957) found that the first Starling clutch was usually initiated after the mean daily temperature was greater than 4.5°C (40°F) for at least 17 days and had remained consistently above this temperature for at least 12 days. Based on previous records, Kessel (1957) predicted that the first clutch for Starlings breeding between 35°-40° north latitude (the latitude in which Kentucky is located) would be started between 1 April and 13 April and second clutches would be initiated between 21 May and 1 June.

In 1981 the first clutch at the WKU Farm was initiated on 10 April following 20 consecutive days with mean daily temperatures above 4.5°C. In 1983 the first clutch was initiated on 7 April, following 12 consecutive days with daily mean temperatures exceeding 4.5°C. The earliest recorded clutch start for Starlings breeding in Kentucky was 30 March in Hopkins County (Hancock 1954).

In 1981, 30 clutches were initiated in 22 of the 62 boxes checked regularly (Fig. 1). The mean starting date for the 17 first clutches was 15 April (range 10-20 April). Ten second clutches had a mean starting date of 23 May (range 16-30 May). The three clutches started between 22 April and 12 May were considered intermediate clutches. In 1983, 67 clutches were initiated in 44 nest boxes (Fig. 1). Because boxes were only visited weekly in 1983, clutch starts were determined by back dating, using an egg laying rate of 1 egg per day per nest box. The latest possible start was used for first clutches and the earliest possible start was used for second clutches. The mean starting date for the 25 clutches was 13 April (range 7-21 April), and 32 second clutches had a mean starting date of 25 May (range 14 May-5 June). Ten intermediate clutches were started in 1983.

The interval between the mean date of clutch initiation for the first and second clutches was 37 days in 1981 and 41 days in 1983. This interval compares favorably with 40 days in Arizona, 39 days in Colorado, and 45 days in Ontario.

In 1981 only 50% of the nest boxes containing successful first clutches were followed by second clutches, but this figure increased to 70% in 1983. Other North American studies showed ranges from 74% nest box reuse in New York to 92% reuse in Ontario.

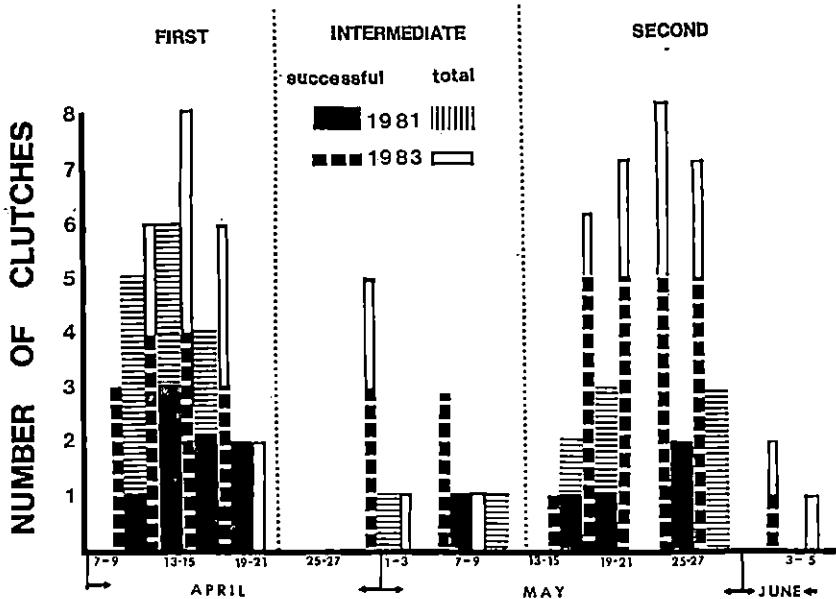


Figure 1. Starling clutch starts and successful clutches in nest boxes at the Western Kentucky University Farm, Bowling Green, Kentucky. Clutches are depicted in 3 day intervals.

In our study only two boxes containing intermediate clutches (Fig. 1) were reused. In one of these boxes the first (intermediate) clutch was started on 29 April but was destroyed before hatching. Subsequently, a second clutch was started in this box on 5 June. This was the latest clutch start during our study and is 9 days later than the previously reported latest egg-laying date (Mengel 1965).

Clutch Size

The average clutch size for the 30 clutches started in 1981 and the 67 clutches started in 1983 was 4.4 and 4.9, respectively. Lovell (1942) found an average clutch size of 4.4 (range 3 to 6) for Starlings in Kentucky.

The average size of the first clutch was only 4.2 (range 1 to 6) in 1981 but was 5.5 (range 3 to 8) in 1983. In 1981 the average size of the second clutch rose to 4.6 (range 2 to 6) but in 1983 the second clutch size dropped to 4.5 (range 1 to 6). However, for both clutch periods in both years, the modal clutch size was five, occurring in about 37% of all clutches.

The increase in clutch size between first and second clutches found in 1981 differs from most Starling breeding studies (op. cit.) in that first clutches (range 4.5 to 5.6) are usually larger than second clutches (range 4.1 to 5.2). However, DeHaven and Guarino (1970) found Colorado Starlings also had a larger second clutch.

Hatching Success

In 1981 the overall hatching success (the percentage of eggs hatched) was 62%; 69% for the first clutch and 46% for the second clutch. In 1983

the hatching success was 59%; 65% for the first clutch and 54% for the second. The hatching success for Kentucky Starlings in our study is substantially lower than in other North American studies. Hatching success for both first and second clutches was between 82% and 84% in Colorado and Arizona. In New York and Ontario, as well as in our study, first clutches had better hatching success than second clutches. However, in the New York and Ontario studies hatching success was much higher, 91% and 92% for first clutches and 80% and 83% for second clutches, respectively.

Nesting Success

Nesting success was the percentage of nests from which at least one young was fledged. In our study, a bird was considered fledged when fully feathered and banded. In 1981, 47% of the first nests and 40% of the second nests were successful. Similarly, first nests in 1983, with 64% success, were more successful than the 59% success of second nests. Even with the liberal definition of a fledgling used in our study, overall nesting success in Kentucky was considerably less (43% in 1981 and 61% in 1983) than the nesting success of Starlings in New York (79%), Ontario (71%), and Colorado (72%). Only Arizona Starlings with 48% nesting success, had nesting success as poor as did Kentucky Starlings.

In successful nests, 3.4 young and 4.0 young were fledged from first and second clutches, respectively, in 1981. In 1983, 3.9 and 3.4 young were fledged from first and second clutches. This number of young fledged per successful nest is similar to that of other areas. The number of first and second clutch Starlings fledged was 3.8 and 3.3 in Colorado, 4.7 and 3.6 in Ontario, and 4.5 and 3.0 in New York. Arizona Starlings, however, only fledged 2.5 and 2.2 young per successful nest.

The increased number of clutches, larger clutch size, and greater nesting success in 1983, as opposed to 1981, is believed to be a result of the following: (1) more boxes were checked regularly (91 vs 62) in 1983, (2) boxes not utilized in 1981 (e.g., along heavily wooded areas) were moved to locations thought to be more conducive to Starling breeding (e.g., in pastures) in 1983, and (3) boxes were put out just before the nesting season in 1981, thereby possibly attracting less fit first year breeders.

Disturbance created when visiting nest boxes seemed to have little effect on the nesting success of Kentucky Starlings. In 1981, 48 birds in 13 clutches fledged from boxes that were visited three times per week and 46 birds in 12 clutches were banded and presumably fledged from boxes visited intermittently.

Mortality

Predation was probably a major cause of egg and nestling mortality. However, non-viable eggs were noted in several nest boxes. A number of breeding colonies of Common Grackles (*Quiscalus quiscula*) were in the vicinity and grackles were often observed around nest boxes. Grackles have been reported to eat eggs and nestlings of a number of bird species (Bent 1965). Additionally, in 1983 a few nest boxes were torn from their anchorage and found on the ground with their contents destroyed. Raccoons (*Procyon lotor*) or opossums (*Didelphis virginiana*) were probably responsible for this damage. Abandonment was probably another major cause of mortality but was difficult to distinguish from predation. Kessell (1957) reported that male Starlings will sometimes remove eggs when the female deserts the nest.

Royall (1966) found overheated nest boxes caused egg mortality. Although most of the boxes in our study were in shady locations, a few boxes placed on fence posts or telephone poles received little shade. Nevertheless, four of the boxes with little or no shade held six successful clutches, indicating little adverse effect on nesting success.

Red fowl mites (*Dermanyssus gallinae*) were present in several boxes during both years of our study. DeHaven and Guarino (1970) indicated these mites may have caused Colorado Starlings to abandon second clutches. Although the relationship between mite infestation and nesting success was not statistically evaluated for Kentucky Starlings, we believe, as did Royall (1966), that mites appeared to have little effect on nesting success.

Band Recoveries

Four Starlings banded as nestlings during our study have thus far been recovered. These Starlings were banded on 12 May 1981. All 4 were recaptured at the WKU Farm near Bowling Green; 2 on 16 December 1982 and one each on 3 and 4 February 1983. These recaptures are significant in that they confirm that Starlings hatched in Kentucky may subsequently winter within the state.

SUMMARY

A nest box study conducted near Bowling Green, Kentucky, supplemented the limited data on Starling breeding in Kentucky. Thirty clutches were laid in 62 nest boxes visited three times per week from 1 April to 1 July 1981 and 67 clutches were laid in 91 nest boxes visited weekly from 11 April to 28 June 1983.

First clutches were started between 7 and 21 April and second clutches were started between 14 May and 5 June. The average clutch size was 4.4 and 4.9 in 1981 and 1983, respectively. The modal clutch size for all clutches in both years was five.

Hatching success for Kentucky Starlings and nesting success were considerably lower than in most other North American studies. However, similar to most other studies, 3.7 young fledged from successful Starling nests in Kentucky.

Acknowledgments

We thank Western Kentucky University for permitting nest boxes to be placed on the University Farm and T. L. Burst, S. A. Dowdy, and P. K. Livingston, for their assistance in nest box construction and placement. We also acknowledge the assistance provided in field work and manuscript preparation and review by A. R. Stickley, Jr., B. R. Ferrell, J. F. Heisterberg, D. F. Mott, and S. J. Silvey.

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THE SPRING SEASON, 1984

ANNE L. STAMM

It was a cool and wet spring. March was cooler than normal by almost five degrees and April by about two degrees. Precipitation in March was slightly less than normal, while in April it was almost two inches above normal. Rainfall was unusually heavy in May, with much flooding in most of the state. The Kentucky River at Frankfort was 10 feet above flood stage on May 8. Bridges were washed out in Pulaski County and US 27 was partially blocked. Hopkinsville was surrounded by water. The Ballard Waterfowl Management Area was closed in mid-May due to high water. The Mississippi and Ohio Rivers, bordering western Kentucky, were out of their banks and many fields were flooded and roads impassible. The heavy rainfall reduced shorebird habitat in some areas for a period of time and some ground nests were undoubtedly destroyed. Cliff Swallows usually start nesting activities along the dams in western Kentucky soon after arriving, but few birds were noted there in mid-May.

Migration was late. There were no major hawk flights reported. There seemed to be a "good movement" of passerines in late April and again between May 1 and 12, although some observers felt there were no "waves" this spring.

Birds new to the state are always of special interest. A *California Gull* (well described and photographed) was seen in March and in May along Kentucky Dam. Other rarities included Eared Grebes, a Red-necked Grebe, a Lesser Black-backed Gull and a Great Black-backed Gull.

Some nesting data were included in spring reports which will be incorporated in the summary of the summer period. All observers who locate nests are encouraged to fill out nest-cards and send them to the writer. Blank cards are available, if needed.

Loons through Bitterns — There were 12 reports of Common Loons, nine of which were of single birds (m.ob.); three at Barkley Dam, April

6 were the earliest (DN, LR); seven at Cave Run Lake, April 8 (JEL); and two at Barkley Dam, May 16 (DS, S, FS); and the latest observation at Kentucky Dam, May 28 (BM, BBC). Pied-billed Grebe numbers were at or above normal in the Danville area (FL), but low elsewhere, with high counts of only five birds at Petersburg and Lake Pewee (LMc, JH, respectively); Horned Grebes were scarce. An Eared Grebe was present at McElroy Lake, Warren County, May 10 (BPB, WM), two there on May 12-13 (WM) and one May 16 (JC). A Red-necked Grebe appeared on Laurel River Lake, March 7 and 21 (JEL), also observed March 8 (DN, JC). Fair numbers of Double-crested Cormorants were reported with the earliest at Uniontown Boat Ramp, March 4 (BPB, with R. Cassell); three at Lake Barkley, April 6 (DN, LR), singles at two locations in Fulton County, April 30 (JEL); but a flock of 23 at Petersburg, May 5 (LMc); one at McAlpine Dam, May 7 (JC) and two there May 29 (BPB). The only Least Bittern reported was a dead bird found by TV engineers in Ballard County about May 19 or 20 (*vide* BPB).

Hérons — Normal numbers of Great Blue Herons were seen (m. ob.). Single Great Egrets were present at Barkley Dam, April 6 (DN, LR), Kentucky Dam, April 16 (LR), and Mayfair Basins, Louisville, April 19 (DN); two near Lake #9 and three at Reelfoot National Wildlife Refuge (hereafter Reelfoot NWR), Fulton County, April 30 (JEL); ten at the latter location and five near Lake #9 on May 18 (S, DS, FS); approximately 30 in Hickman Bottoms, adjacent to Lake #9, May 27 (BBC). The only Snowy Egret was one feeding with Great Egrets in Reelfoot NWR, May 18, (S, DS, FS). There were only two reports of adult Little Blue Herons; one near Clinton, Hickman County, April 30 (JEL); one flying over wooded treetops north of Hickman, May 17 (DS). Cattle Egrets were widely distributed and appeared in eight counties: Fulton, Hickman, Marshall, Caldwell, Simpson, Jefferson, Mercer and Fayette (m. ob.) from April 22-May 27. Most sightings were of one to seven birds, but 31 were seen below Kentucky Dam, May 9 (CP). Black-crowned Night Herons began arriving in the Louisville area March 17-25 (BPB, DN, BBC), but numbers increased to 130 on May 30 at the Falls of the Ohio (LR); only one sighted in Fulton County, May 18 (S, FS, DS). Yellow-crowned Night Herons were reported from only three locations: eight at Lexington (MF), five in Fulton County (BBC); and one at Shippingport Island (LR).

Waterfowl — A single "crippled" White-fronted Goose was seen at Ballard Waterfowl Management Area (hereafter BWMA) on April 7 (DN, LR). The majority of Canada Geese left in February, but small groups of 19-25 were present at Mayfair Basins and at Laurel Lake in mid-March (DN, JC) and 27 near Lake #9, May 18 (S, DS, FS) and 25 there May 27 (BBC).

The more unusual records included 90 Northern Shovelers in Union County, March 4 (BPB, with R. Cassell); a count of 100+ Redheads and 150 Ring-necked Ducks on McDougal Creek Lake, Larue County, March 11 (JEL) and 91 of the latter species at Lake Pewee, March 26 (JH). A Greater Scaup was present at Uniontown Boat Ramp, March 4 (BPB). A rather late Lesser Scaup was seen at Oldham County Park, May 7 and 8 (DN, JC, respectively). Oldsquaws staged a good flight with one flock of 25 and one of 17 above Barkley Dam, March 31 (BPB) and seven the week of April 3 (A. Heilman *vide* BPB). A Common Goldeneye lingered at Kentucky Lake until April 15 (CP) and a pair of Buffleheads at Hays

Kennedy Park, Louisville, May 8 and a female at Pulaski County Park, May 9 were also late in departing (LR, JEL, respectively). Red-breasted Mergansers were widespread, with a maximum of 200-300 in flight over Kentucky Lake, April 1 (BM, DN); and the 30 at Cave Run Lake, April 8 deserves mention (JEL). A count of 79 Ruddy Ducks at Lake Pewee, March 19 was the high for the state (JH) and the 20 at Uniontown Dam on March 4 were also of interest (BPB, with R. Cassell); a single bird was still present at Lake Nevin, Bullitt County, May 4 (JEL).

Vultures, Hawks — A flock of 17 Turkey Vultures was seen in east Jefferson County on March 25 (S, FS); and 51 in Boone County, May 5 during an all-day count (LMc). Single Ospreys were reported in April from the following counties: Taylor, Pulaski (JEL), Fulton (DN, LR), Jefferson (BPB); and two in Ballard County, May 17 (S, DS, FS). Good numbers of Mississippi Kites were reported: an adult perched on a tree on the outskirts of BWMA, May 17, a flock of eight flying low over a field east of the levee in southwest Fulton County and four a few miles north of the latter sighting, May 17 (DS, S, FS); two over Wickcliffe, Ballard County, two over Chalk Bluff Road, just south of Columbus and 13 in a loose flock along the Mississippi, about two miles south of Columbus, Hickman County, May 26 (BBC) and one over Reelfoot NWR, Fulton County, May 27 (BBC). Two sub-adult Bald Eagles were seen at Green River State Park, Taylor County, March 4 and one there March 11 (JEL); an adult at Wolf Creek Dam, March 23 (LR); and approximately 25 in Hickman Bottoms, Fulton County, April 1 (BPB). Fifteen Northern Harriers were reported from Warren County westward to Fulton County between March 20 and April 7 (m. ob.). Red-shouldered Hawks continued to be scarce. A flight of nine Broad-winged Hawks was seen at Burlington, April 22 and an immature at Boone County Cliffs being harassed by a Cooper's Hawk, May 5 (LMc). Single Rough-legged Hawks were recorded at the Henry/Oldham County line, March 7 (JC); Jefferson County, March 16 (DN) and near Gilbertsville, Livingston County, April 6 (DN, LR).

Rails through Cranes — Four King Rails were heard calling (two were seen) in a nearby marshy area of Reelfoot NWR, May 27 (BBC). One to two Sora Rails were reported from four locations, with the earliest at Bowling Green, April 26 (WM), and another two days later at Central Wildlife Refuge (KOS); Louisville and Anchorage records May 7-16 (BPB, R. Schott *vide* G. Adams, respectively). A Purple Gallinule at Mammoth Cave National Park on a small pond, April 28 was noteworthy (JB, PB). Good concentrations of American Coots included 760 at Lake Pewee, March 26 (JH) and 300 upstream from Louisville, April 3 (JY); last reported on May 6 at Lake Pewee with 39 birds. Small flocks of Sandhill Cranes were still moving northward on March 4: 28 at Glasgow (RS), 19 at Green River Lake State Park (JEL) and a flock of 14 and one of 12 over southwest Oldham County (JC); 96 over Grahampton, March 14 (BN) and eight at Mayfair Basins, March 24 (DN).

Shorebirds — Shorebird migration was rather spotty with largest concentrations in western Kentucky. Noteworthy Lesser Golden Plover concentrations included 900 in Hickman Bottoms, April 1 (BPB), 500 on April 7 (DN, LR); 200+ just west of Hickman, April 30 (JEL) and 50 still present just above the Tennessee line, May 9 (CP). Greater Yellowlegs began arriving in small numbers at Louisville and Bowling Green between March 17 and 23 (BPB, WM), a maximum of 75+ west of Hick-

man, April 30 (JEL); numerous in Maceo Bottoms, Daviess County, May 9 (AP) and also present near Frazer, Wayne County, May 15 (JEL). Lesser Yellowlegs were widespread with concentrations of 150 in Hickman Bottoms, April 1 (BPB) and 300 west of Hickman, April 30 (JEL). Solitary Sandpipers were quite evident in Boone County (LMc). A few Willets were reported: nine below McAlpine Dam, May 7 (JC) and one below Kentucky Dam, May 9 (CP). There were five Upland Sandpipers in fields of eastern Jefferson-western Oldham Counties, April 21-22 (BPB, m. ob.) and several at Bowling Green, May 12 (WM). Two Ruddy Turnstones in breeding plumage were seen below Kentucky Dam, May 9 (CP), several at the transient lakes, May 12 (WM), two in bottomland of Obion Creek at SR 123, Hickman County, May 26 (JG, BBC) and three at Smithland Dam, Livingston County, May 27 (BPB, BBC). A single Sanderling, a rare spring transient, was observed below Kentucky Dam, May 9 (CP) and three in Fulton County, May 26 and 27 (BPB, BBC). A single Semipalmated Sandpiper was present on April 22 in western Oldham County (BPB), but concentrations of 300-400 were on Mud Creek, Fulton County, May 26 and 200 were there on May 27 (BBC); a White-rumped Sandpiper was with the flock on the latter date (BPB, BBC). A high count of 350 Pectoral Sandpipers was reported from Hickman Bottoms, April 1 (BPB). Dunlin sightings included one along the Jefferson Freeway, May 7 (DN), four to five at three Warren County locations May 8-12 (JC, BPB, WM); 30 on riffraff on the lake side of Kentucky Dam and 15 below the Dam, May 9 (CP). A count of 45 Common Snipe was made in a marshy area on the outskirts of Bowling Green, April 10 (WM). The following Short-billed Dowitchers were seen and call notes heard: 13 near Harrodsburg, Mercer County, May 12 (JEL); 15 in Maceo Bottoms, May 9 (AP with P. Roco); and two in Warren County, May 16 (JC).

Gulls through Terns — Bonaparte's Gulls were fairly well distributed, with high counts of 100 at Cave Run Lake (JEL) and 275 from Clark Bridge to below the Falls of the Ohio on April 8 (BPB); latest sighting — three birds — below Kentucky Dam, May 9 (CP). Ring-billed Gulls continued to be widespread with high counts of 100 at Green River Lake, March 4 (JEL); 300 at the Falls of the Ohio, March 14, 300 at Kentucky Dam and 500 at Barkley Dam, March 31 (BPB); some 200 still present above Kentucky Dam, May 16 (S, DS, FS); and 13 remained at Kentucky Dam, May 28 (DN, BBC), and one was at the Falls of the Ohio, May 29 (BPB). A Thayer's Gull in first-year plumage was present at Barkley Dam, April 6 (DN, LR). A *California Gull* was seen and photographed at Kentucky Dam, Livingston County, March 31 (BPB) and another, or possibly the same bird, was seen with a flock of Ring-billed Gulls and a few Herring Gulls above the Kentucky Dam, May 16; all details were noted and documented (S, DS, FS). This is a new species for the state. Other unusual sightings, which were documented, included a *Lesser Black-backed Gull* at Barkley Dam, April 1 (BM, DN, M. Monroe); a first-year *Great Black-backed Gull* at the Falls of the Ohio, March 14-16 (DN, BPB); also observed on the latter date by Lene Rauth and John Callahan. The latter bird remained about a week (DN). Caspian Terns were first reported on April 1 at Louisville along the Ohio River (JC, BPB); the singles at Barkley Dam (BM) and Kentucky Dam Village State Park on May 28 were the latest encountered (DN, BBC). Few observers mentioned the Forster's Terns, but reports indicated sightings on May 7 at McAlpine Dam (LR, JC), Pulaski County Park (JEL) and two near Hickman, May 27 (DN,

BBC). The three Common Terns in Marshall County, May 28, were the only ones reported (DN, BBC). Four Least Terns were present in southwestern Fulton County, May 18 (DS, S, FS); three over flooded bottomland of Obion Creek, Hickman County, May 26 (BBC); two at Lake #9, May 27 and four at Smithland Dam, May 28 (BBC). The migration of Black Terns was better than it has been for some years: one at Oldham Park, April 7 (DN, with Dr. Noonan), but 10 there, May 6 (BPB); six near Woodburn, Warren County, May 8 (JC); one at McElroy Lake, May 10 (BPB); a total of 34 at two locations in Hickman County, May 26, about 52 at Smithland Dam, singles at Lake Barkley and Kentucky Dams, May 28 (BBC).

Cuckoos through Swallows — Yellow-billed Cuckoos were late in arriving and were scarce. Black-billed Cuckoos were also scarce. Common Nighthawks appeared to be in low numbers in many areas and Whip-poor-wills showed a decrease in the Bedford area, Trimble County (JY). Ruby-throated Hummingbirds were "difficult to locate throughout the spring" in Boone County (LMc), but common on vetch along the roadsides and fields in Ballard, Hickman and Fulton Counties, May 16 (S *et al.*) and May 26 and 27 (BPB, BBC); also good numbers in Daviess County (AP). A single Yellow-bellied Flycatcher was seen at Oldham County Park, May 7 (DN); one or two at Louisville, May 14, 19 and 31 (BPB); and one at the Land Between the Lakes, May 28 (BM). A number of the uncommon Alder Flycatchers were seen and heard: singles on Surrey Hill Farm, Louisville, on five dates between May 14-30, three on May 21 and two on May 31 (BPB); one at Grahampton, Meade County, May 10 (BN); and one at WKWMA, McCracken County, May 26 (BBC). Least Flycatchers were late in arriving and none were seen on field trips at Berea, April 28 and 29 (KOS); present at Madisonville from May 1-15 (JH) and at Louisville from May 6-25 (DN and BPB). A flock of 25 Eastern Kingbirds was seen on a ploughed field in Bedford, May 8-9 (JY). Purple Martins arrived at Somerset, March 15 (JEL), at Louisville, March 16 (DN) and Bowling Green, March 17 (WM); a colony of 150 to 200 in Ballard County, May 17 (S, DS, FS). Tree Swallows were on schedule and high counts included 200+ at Pulaski County Park, April 10 (JEL) and 200 at Hays Kennedy Park, May 4 (S, FS); all other swallow species arrived later than normal and were in low numbers (m. ob.).

Crows through Thrushes — Three Fish Crows were reported and each in different locations: the one in Trigg County, March 10 was unusual (CP), another at Hickman Bottoms, April 1 (BPB), and one on the outskirts of BWMA, May 17 (DS). Most reports of Red-breasted Nuthatches were of single birds, but eight were found at Laurel River Lake, March 7 (JEL); one still present at Danville, May 10 (FL). Bewick's Wrens were still scarce, but it was encouraging to find one to three birds at the following locations: Land Between the Lakes area, two places at Murray (CP), one in Madisonville (JH) and at Elizabethtown (GE). The reports of Sedge Wrens were interesting; one in a weedy field at Bowling Green, May 3 and three in a field just outside Warren County on May 10 (WM); also observed at Lexington (MF). Only two reports of Marsh Wrens were received: one in Oldham County and two birds in Jefferson County, May 6 and 14, respectively (BPB). Twenty-five to thirty Ruby-crowned Kinglets were seen at Cave Hill Cemetery, April 23 (DN); several lingered until May 10 at Madisonville (JH) and at various places in Boone County

(LMc). Good increases were noted in the numbers of Eastern Bluebirds. Veerys were widespread and more common than usual at Danville (FL). Grey-cheeked Thrushes passed through in good numbers and Swainson's Thrushes were "abundant" at Bowling Green (WM), "more than usual" at Danville (FL) and "common in migration" in Boone County (LMc). Wood Thrushes continued their decline in the Danville area (FL) and in some areas in the Louisville region. (S).

Pipits through Vireos — Water Pipits were present in small numbers from March 17 through May 2, with the largest group — two flocks totaling 37 birds, May 1 — on the Oldham/Jefferson County line (DN). Spring migrant Cedar Waxwings began appearing at Fort Wright on March 24 (EG) and at Louisville, April 12 (S), with small groups of 25-30 birds; greatest number between May 10-18 (m. ob.). There were 13 sightings of Loggerhead Shrikes. Two Bell's Vireo's at West Kentucky WMA on May 26 were the only ones reported (BBC). White-eyed, Solitary and Warbling Vireos began arriving later than usual and were present in good numbers at Danville (FL). a few Philadelphia Vireos were reported.

Warblers — There were mixed comments about the warbler migration, but as a whole, migration was late and best movements occurred April 26-28 and May 9-12. Orange-crowned Warblers were recorded in Jefferson County Forest, April 15 (DN), Fish Pond Road, Fulton County, April 30 (JEl) and several at Louisville, Jefferson County in late April to early May, with the latest on May 13 (BPB). Nashville Warblers passed through in good numbers at Danville (FL). A Magnolia Warbler along Middle Creek Road, Boone County, May 26 was late for there (LMc). Good "waves" of Cape May Warblers were seen in the Bowling Green area from May 1-12 (WM) and 10 were spotted May 9 in Pulaski County Park (JEl). Two Black-throated Blue Warblers were reported: one April 30 at Joe Creason Park, Louisville (J. Lewis *vide* BPB and later by others) and one at Boone County Cliffs, May 5 (LMc). Good numbers of Blackpolls were present in the Bowling Green area May 1-12 (WM) and "most evident" at Burlington May 9-10 (LMc). The Cerulean Warbler continued to be scarce in some locations and was seen for the first time in three years in the Fork Knox area (JG). A Swainson's Warbler in southwest Fulton County, May 18 was of interest (DS, S, FS). Three Connecticut Warblers were reported in the Maceo area on May 5 (M. Brown *vide* AP) and two in the Louisville area, May 14 (BPB). Another uncommon transient, the Mourning Warbler, was present during May in Carlisle County (MF), Hopkins County (JH) and two locations in Jefferson County (BPB, JB, PB). Hooded Warblers were "remarkably scarce" in the Danville area (FL). A Wilson's Warbler in the Murray area on May 27 was a rather late straggler (BM). Fair numbers of Canada Warblers were reported from May 1 through 28 (m. ob.).

Grosbeaks through Sparrows — The main flight of Rose-breasted Grosbeaks appeared to be April 28 through May 10 (m. ob.), with several birds at local feeders at Louisville (DN) and at Valley Station. The birds at the latter station fed with Evening Grosbeaks from May 5 to May 20 (DS). Normal numbers of Blue Grosbeaks were reported from Pulaski to Calloway and Carlisle Counties (m. ob.). Indigo Bunting migration was evident in the Murray area with flocks of 10-20 birds from mid-April to early May (CP). There were more Dickcissels than for the past few years with the majority in western Kentucky (m. ob.); two on May 3 in the Danville

area were the first recorded there since 1980 (FL). The rare Bachman's Sparrow was seen near New Concord, Calloway County, May 28 (BBC). A single Lark Sparrow was seen on a Louisville farm, May 5 (BPB, DN, D. Ebel). Large flocks of Savannah Sparrows moved through the Western Kentucky University Farm, April 21 (WM). A male Lapland Longspur in Hickman Bottoms, April 7 was a late straggler (LR). A flock of 30 Bobolinks at Bedford on April 30 was the first reported (JY); the majority of the migrants passed through the first week of May (m. ob.). A Western Meadowlark was seen and heard in Lyon County, May 16 (S, DS). About 15 Brewer's Blackbirds were observed in Hickman and Mud Creek Bottoms, Fulton County, April 1 (BPB) and 20 in the same County, April 7 (DN, LR). Northern (Baltimore) Orioles began arriving in Maceo on April 26 (AP) and were "abundant" in Barren and Warren Counties May 6-12 (WM). There seemed to be quite an influx of Purple Finches in central and northern Kentucky April 28-May 1 (LMc, S. DN), with a total of 56 in the Outer Loop area, Louisville on the latter date (DN). House Finches continued to be common and widespread. About 15 Pine Siskins were present at a feeding station at Valley Station throughout the period (DS); some movement noticed at Eubank May 9-10 when 40 were present on the latter date and last recorded there May 16 (JEl with D. Elmore). Evening Grosbeaks were present at several feeders in the Valley Station area throughout the period and peaked at 100+ on April 2 at one feeder (P. Steilberg *vide* DS) and 40 at another, where they remained until May 22 (DS); also common in Boone County throughout the period and last recorded there on May 13 (LMc).

Special thanks are due the members who sent detailed notes of their findings. These reports would not be possible without the continued cooperation of our members. Information on the Fall Migration (August, September, October and November) should reach the writer no later than December 7. As always, all unusual sight records and birds out of season must be documented at the time of the observation.

Contributors — Jane Bell (JB), Patricia Bell (PB), John Callahan (JS), C. V. Covell (CV), Jackie Elmore (JEl), George Elliott (GE), Michael Flynn (MF), John H. Getgood (JG), Ed Groneman (EG), James W. Hancock (JH), Frederick Loetscher (FL), Lee McNeely (LMc), Wayne Mason (WM), Burt L. Monroe, Jr. (BM), Robert Morris (RM), Barry Nichols (BN), Doxie Noonan (DN), Brainard Palmer-Ball, Jr. (BPB), Ciell Peterson (CP), A. L. Powell (AP), Lene Rauth (LR), Anne L. Stamm (S), F. W. Stamm (FS), Russell Starr (RS), Donald Summerfield (DS), John Young (JY). Other abbreviations — Beckham Bird Club (BBC), Ballard Waterfall Management Area (BWMA), Kentucky Ornithological Society (KOS), Reelfoot National Wildlife Refuge (Reelfoot NWR), West Kentucky Wildlife Management Area (WKWMA).
— 9101 Spokane Way, Louisville 40222.

KENTUCKY'S 1984 EAGLE CENSUS

JAMES S. BURELL AND ANNE L. STAMM

The 1984 Kentucky mid-winter eagle census surpassed any of the previous annual inventories. The number of migrant Bald Eagles that winter in the state vary from year to year and perhaps this depends largely on the food supply and weather conditions.

The national count period this year ranged from January 2-16, with the target date January 5 and a back-up date of January 7. Fortunately, at least 73% of the eagle counters checked the territories assigned to them on January 5-7.

The January census indicated a total of 221 Bald Eagles: 142 adults and 75 immatures, with four of unknown age. This represents an increase of 63% over the January 1983 census. Also, the population along the Mississippi River showed an increase of 57 Bald Eagles over 1983. Some gains were noted at the Land Between the Lakes, the Ohio River, Wickliffe to Golconda, and Cave Run Lake. There was a slight decrease at Lake Cumberland and at Dale Hollow. A total of 11 Golden Eagles was also sighted (see Table 1).

**TABLE I. Summary of the 1984 Kentucky Eagle Census
January 2-16, 1984**

Location	Bald Eagles				Golden Eagles			
	A	I	U	T	A	I	U	T
Mississippi River	43	29		72	5			5
Land Between the Lakes	34	20		54				
Ohio River, Wickliffe to Carrsville .. (N. Livingston)	30	13	4	47			3	3
Carrsville to Owensboro	2	1		3				
Owensboro to Meldahl Dam	3	1		4				
Rough, Nolin, Green, Barren River Lakes	2	1		3				
Kentucky River	1			1				
Casey County					1			1
Dale Hollow	6	2		8				
Cave Run and Grayson Lake	3	3		6				
Lake Cumberland, Big South Fork	14	2		16	2			2
East Kentucky Lakes (5)				0				
Magoffin County		1		1*				
Laurel Lake	4	2		6				
Mammoth Cave National Park				0				
Cumberland Gap				0				
TOTALS	142	75	4	221	8		3	11

*Eagle found shot, died three days later; believed to be of the Cave Run flock.

The weather was extremely cold when most counts were taken. Reelfoot Lake was frozen and this condition caused many of the eagles to move into Kentucky where there was open water on the Ohio and Mississippi Rivers, although scattered ice flows were present. Smaller bodies of water such as Salt River and Cave Run were frozen, whereas, Buckhorn, Green River and Martin's Fork Lakes were partially frozen.

In some areas the food supply was scarce and in others, where large bodies of water were open, some fish, ducks and geese were available.

Eagles were noted feeding on two dead deer, which were frozen and lying on the ice on Cave Run Lake. Also, eagles were seen feeding on dead ducks and geese on Goose Pond Lake. Another source of prey was dead shad.

At some locations more than one party surveyed the lake or river. Where this took place, the marked maps were carefully screened to avoid duplications. It may be well to mention that upper Lake Cumberland was not censused.

In addition to the eagles censused, the following hawks were tabulated: one Osprey (no details), six Northern Harriers, four Cooper's Hawk's, two Red-shouldered Hawks, 80 Red-tailed Hawks, 61 American Kestrels, and 14 unidentified hawks.

There were 41 parties in the field and at least 65 participants. The census was coordinated by James S. Durell, assistant director of Wildlife Management of the Kentucky Fish and Wildlife Department. Groups participating were: Kentucky Fish and Wildlife Department, Kentucky Ornithological Society, Tennessee Valley Authority, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, U.S. Forest Service and a few individuals affiliated with other groups.

—Kentucky Department of Fish and Wildlife, Frankfort 40601 and 9101 Spokane Way, Louisville 40222.

NEWS AND VIEWS

BELATED REMEMBRANCE

Howard Rollin, a widely known bird artist and longtime member of the K.O.S., died 11 November 1983 at the age of 74. This native of Colorado will be fondly remembered by the K.O.S.

FALL K.O.S. MEETING

Our fall meeting will be held at Morehead State University 28-30 September 1984. Mark your calendar now and plan on sharing summer experiences with fellow birders while stalking the elusive fall migrants. Those of you that would like to present a paper or share birding information at the Friday evening meeting, please notify Dr. Fred Busroe, Department of Biological and Environmental Sciences, Morehead State University, Morehead, Kentucky 40351.