

FIGURE 1. Directional data from ceilometer watches (one complete dot = 2 birds). A, 13 October, 20:45–21:15 CST; B, 13–14 October, 23:47–00:17 CST; C, 14 October, 22:24–22:29 CST; D, 14 October, 23:15–23:30 CST.

I counted 61 birds (122/hr) during another ceilometer watch between 23:47 and 00:17. There were two distinct directional components, 165° and 220° (fig. 1B). Thrush calls had increased to 30/min by this time, and the surface wind was still from the NNW, now blowing at 15–22 knots. The census the following morning showed an increase in the number and variety of passerine migrants on the ground.

The sun was not visible for the whole day of 14 October and the cloud cover persisted all that night. The surface wind early in the night was still from the NNW at 10–18 knots; after midnight it shifted to NNE.

During the first ceilometer watch on the night of 14 October, 22:24–22:29, I counted 26 birds (312/hr) flying virtually every direction on the compass (fig. 1C). Many birds had headings different from their tracks and appeared to be flying at widely varying

altitudes. The second watch was made between 23:15 and 23:30. I counted 75 birds (300/hr), again flying in what appeared to be random directions (fig. 1D).

At dawn on 15 October the overcast remained, although it was higher than it had been before. At first light I looked aloft with 8×40 binoculars and saw a very large, high-altitude movement of passerines flying to the north over the island. I estimated that about 500 birds passed over my observation point in the hour between 05:40 and 06:40. Approximately 10 per cent of the birds dropped down and landed in the woods on the island, and the rest continued inland over the marsh north of Grand Isle. No flocking behavior was discernable, and birds were continuously visible in the binocular field.

On neither night were stars visible, yet most birds were flying in directions appropriate to the season on the night of 13 October. The two directional components corresponded to the different wind directions at the surface and at 2000 ft, suggesting that birds were merely following wind direction, as pointed out by Gauthreaux and Able (Nature 228:476, 1970). There is no evidence, however, that this was the case on the night of 14 October, even though the wind situation was virtually the same.

The results for both nights were tested statistically according to procedures given in Batschelet (AIBS Monograph 1965). The directions that I recorded the second night were random for the first watch but non-random for the second according to the results of the Rayleigh Test for uniform distribution. The angular deviation of 69° for the second watch was extremely high, however, compared with 30° for both watches on the first night. The one environmental factor different on the second night was that the sun had not been visible for the entire day before, whereas on 13 October the sky had been essentially clear until mid-afternoon. If nocturnal migrants receive some kind of directional information from the sun, the observed behavior might be predicted.

The reverse migration at sunrise on 15 October could have been an attempt to regain land by birds that found themselves over water at first light. This behavior has not been previously reported from the northern coast of the Gulf of Mexico.

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RESPONSES OF ADULT KILLDEERS TO A DOWNY YOUNG DISTRESS CALL

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On 21 May 1970 I encountered an adult Killdeer (*Charadrius vociferus*) with a downy young while I was tape recording birds at the University of Michigan Botanical Gardens, Dixboro, Michigan. The young crouched on the ground near me while the adult moved about 15 m away. The vocalizations of the

young were recorded with a Uher 4000 Report-S tape recorder ($7\frac{1}{2}$ ips) as he was gently lifted several inches from the ground. The calls consisted of a series of short, piping notes between 3.6 and 5.8 kHz. Note duration was variable, but most notes terminated with a downward deflection (fig. 1a). During the recording the adult bird came to within 3–4 m of the calling young and then moved away in a broken-wing posture. When the calls were replayed about 10 m from the location of the young, the adult approached the source of the sound and again moved away in a broken-wing posture.

Later in the morning, calls were recorded by the same procedure from a downy young, probably the same one, at a location a few meters from the first site. These calls were played at high volume at another site 60–70 m from the first. Three adult Killdeers flew to within 10 m at about the same time and gave broken-wing postures. The adults were also calling loudly (fig. 1b), so that the possibility cannot

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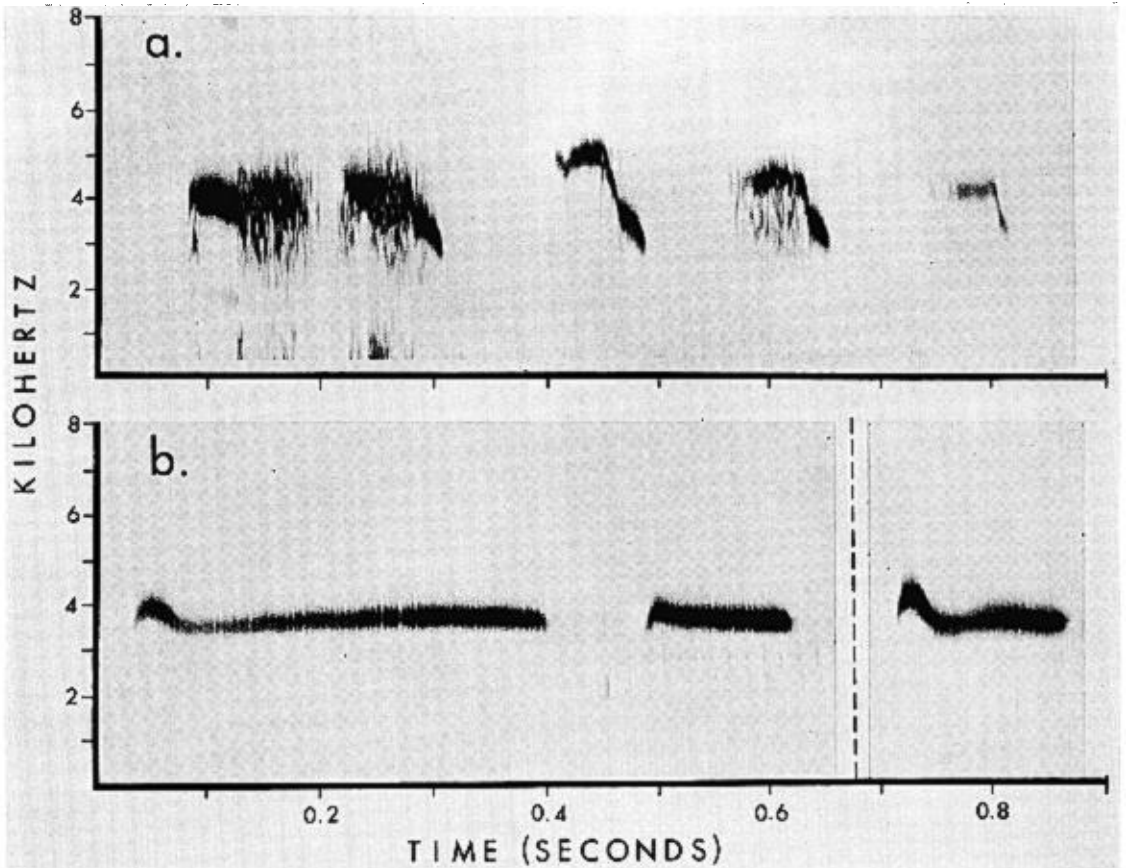


FIGURE 1. Two calls of Killdeers: a, excerpt from distress calls of a downy young; b, calls given by adults while presenting a broken-wing display.

be excluded that the adult calls were also involved in attracting adults to the area; however, their nearly simultaneous arrivals seem to preclude this.

These responses to the distress calls of the young show that the vocalizations alone are sufficient to elicit distraction displays from adult Killdeers. Previous studies (e.g., Deane, *Auk* 61:243, 1944) have

emphasized injury-feigning with reference to intruders near the nest or the young, but the role of the young in eliciting distraction display has not been previously reported.

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ADAPTABILITY AND SITE TENACITY IN AN INDIVIDUAL STARLING

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On 29 December 1969 I captured an adult male Starling (*Sturnus vulgaris*) in a decoy trap, 7 mi. S of Annapolis, in Anne Arundel County, Maryland. This bird was kept as a captive for the next seven months, and was a member of a group used in a series of ex-

periments on bioenergetics. Each experimental bird was kept individually in a cage approximately 2 × 1 × 1 ft. Food (Turkey Starter Crumbles) and water were supplied ad libitum. The birds were handled at least three times a week.

The bird in question was released on 10 July 1970 and recaptured at the same trap site on 3 December 1970. This sequence indicates the great adaptability of this species in that a long period in captivity did not render the male in question susceptible to subsequent environmental pressures. In addition, the site tenacity of an adult Starling through a summer and two winters provides yet another record of permanent residency in this species.

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