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## THE KILLDEER BREEDING BIRDS OF THE PHILADELPHIA REGION (Part IV)

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This is my fourth paper in *Cassinia* on the breeding birds of the Philadelphia region. Observations are based on my own notes except where otherwise specifically stated.

### KILLDEER

*Charadrius vociferus vociferus* Linnaeus

*Local Names*—The word "Killdeer" is onomatopoeic, derived from the bird's notes. It is written also as Kildeer, Killdee, and Kildee. Unlike most shorebirds this species is not burdened with many vernacular names. Catesby called it the Chattering Plover, which name I have never heard used. The Pennsylvania Dutch called it Gilderee (Beck, H. H., "The Ornithology of Lancaster County, Pa." in Lancaster Co., Pa., A History, 1924). It is also called Ring Plover and Ring-necked Plover, confusing it with the Semipalmated Plover. Meadow Plover and Field Plover are sometimes used. The Black-bellied Plover is called the Black-bellied Killdeer in G. Trumbull's "Names and Portraits of Birds" (1888), although, curiously, the Killdeer itself is not mentioned.

### HISTORY

Turnbull, W. P., (The Birds of East Pennsylvania and New Jersey, 1869) says the Killdeer was "especially abundant along the seashore in winter." C. C. Abbott (Cyclopedia of Natural History, 1887) reported it "common as a visitor, but few now remain to breed . . . (It is) found only in spring and autumn." Fifty years ago, when I first began the study of birds, it was rare, especially in summer. It was a game bird hunted throughout the year and particularly from September 1 to May 1.

Today, as the result of protection, the Killdeer is common and the only shorebird that can be observed in a day's outing almost any day along the seacoast.

## OCCURRENCE

*January*—Very few Killdeer are found inland in this region although they are of regular occurrence at the seashore and along tidal streams. I have 14 January records away from the coast: 10 of single birds and 4 of 2 birds. On January 23, 1940, at Frankford I watched two Killdeer feeding along a small brook in a meadow near a woods with the ground covered with 10 inches of snow and a temperature of 16°.

*February*—I have 35 records, usually 1 or 2 birds, with a flock of 5 once at Bordentown, N. J. Migration often commences toward the end of the month.

*March*—My average date for the arrival of migrants is March 5, making the Killdeer rival the Bluebird as a harbinger of spring. The Woodcock usually appears about a week later. Killdeer normally arrive singly or in pairs. I have seen 7 on March 3, 1917 at Richmond (Philadelphia) and 9 on March 12, 1939 at Bombay Hook, Delaware. Nesting begins during the month, some early nests having eggs before the 20th.

*April*—Approximately 85% of the birds seen during April are nesting. Many broods hatch the last week of the month.

*May*—Practically all of the young of the first brood have hatched by the middle of the month. By the end of the month second sets of eggs may be laid. On May 15, 1927 at Rio Grande, N. J., I saw a flock of 35 birds, mostly young of the year, in a bare field. Although most Killdeer are nesting at this time, some of the young in this flock were not yet full grown.

*June and July*—Nesting continues during these months for a few birds, and flocking begins. I saw 42 on July 2, 1921, at North Wales, Pa., in a potato field, the largest group of Killdeer I have ever seen in this month. I found a nest on July 15, 1934, at Richmond with 3 incubated eggs.

*August through October*—Flocking continues.

*November*—This is the month of departure for flocks of migratory Killdeer. I saw a flock of 313 at Penn Manor, Bucks County, Pa., on November 13, 1938, in a spinach field; 80 on November 14, 1936, near Rancocas Creek at Centerton, N. J. and 60 on November 10, 1946, at Bombay Hook, Del. Fred Schmid and John Hess saw a flock of 213 on November 3, 1940, in a field at Higbee's Landing, N. J.

*December*—Occasional flocks are seen. I saw 27 on December 23, 1939, at Riverton, N. J. and 27 on December 21, 1941, at Cape May, N. J. E. M. Kerrigan saw a flock of 30 in a snow-covered meadow along a brook on December 28, 1919, near North Wales, Pa. Ernest Choate recorded 110 on December 28, 1947, near Cape May, N. J. A. C. Bent (U. S. Nat. Mus. Bull. 146, 1929: 211), in his Life History of the Killdeer mentions no flock larger than 50.

## NESTING

The Killdeer is one of our earliest nesting birds, beginning about the same time as the Woodcock, Prairie Horned Lark, Long-eared Owl and Barred

Owl, and over a month later than our earliest nesting bird, the Great Horned Owl.

Careful study of the date of arrival and the time of its nesting indicates that the Killdeer arrives here much earlier than March 20, the usual date given for its spring appearance. I believe it arrives mated, and M. P. Skinner in Bent (1929: 213) states: "All through the winter, the Killdeer seemed to be roughly paired" at Pinehurst, N. C. The following data on inland arrivals and first nest found support this belief:

<i>Date first seen</i>	<i>Date first nest</i>
1923—March 2	April 7—3 eggs, slightly incubated
1925—March 2	April 3—4 eggs, slightly incubated
1927—March 7	April 4—4 eggs, fresh
1930—March 2	April 14—4 eggs, fresh
1933—March 5	April 9—4 eggs, highly incubated
1934—March 4	April 9—4 eggs, slightly incubated
1935—March 3	April 3—4 eggs, highly incubated
1936—March 5	March 30—4 eggs, fresh
1937—March 5	April 6—4 eggs, slightly incubated
1938—March 8	April 12—4 eggs, fresh
1939—March 1	April 6—4 eggs, fresh
1945—March 1	April 2—4 eggs, slightly incubated
1946—	March 25—4 eggs, fresh

A study of my notes indicates that Killdeer are nesting, on an average, within five weeks of their arrival, and in some instances within two or three weeks. For example, in 1933 my first record was March 5; since the eggs were about 20 days incubated on April 9, they must have been laid about March 20. Similarly, in 1935 eggs 14 days advanced were found on April 3, indicating they must have been laid about March 19. That year the first record was March 3.

Nest building is done by both birds. The nest is a scratched out hollow in the ground, the birds using their feet and bill to remove the dirt and pebbles. They line the nest with the materials at hand, depending on the locale:

Grass field—Bits of grass and weed stems

Cinder field—Flakes of cinder.

Rocky field—Bits of rock.

Gravel field—Pebbles and fine gravel.

Sandy flats at seashore—Shell fragments.

Some writers say the nest is merely an unlined hollow scooped out of the earth, but I have never seen an unlined occupied nest. They often dig sham nests, which are never lined, often a few feet from the occupied nest. I have found from one to six sham nests in the same field, but as yet am unable to definitely explain their use, if any.

Killdeer nest in open fields, rarely close to water or in wet locations. These include corn stubble fields, fields of growing corn and oats, burned over grass fields, stony fields, old dumps, along railways, in asparagus fields, and on

shoulders of roads. There is a record of a pair raising a brood on the gravel roof of a large middle western building, 50 feet in the air. The young safely dropped to the ground. The few nests found in wet locations are usually thickly lined with bits of dry grass.

When nesting along road shoulders a Killdeer will permit an automobile to approach quite near, running along the road ahead of the car for some distance before taking wing. If approached by car beside a bare field, the bird will run into the field instead of flying. It will return, usually by running, directly to the nest after the vehicle has passed.

Birds nesting on railway embankments behave almost in the same way, running off for a few yards before flying away as the train approaches. It is apparently oblivious to the noise and disturbance. A Wisconsin oologist found a nest with 4 eggs in the middle of a railroad track where many freight and passenger trains passed daily.

One of the favorite nesting locations in this region is burned over fields of *Andropogon* grass. In March and April these fields are blackened and full of stubbly grass clumps from 1 to 3 inches high. Since they are barren and destitute of animal life, there is no attraction for crows and rats, two bad enemies of the Killdeer.

#### EGGS

I have examined 200 nests with eggs: 172 contained 4, 1 contained 5 and 27 contained 3 eggs. My earliest date is 4 fresh eggs on March 25; my latest, 3 highly incubated eggs on July 15. My average date for the first set is April 7; for the second set, June 1. The nesting cycle is 7 weeks—4 for incubation and 3 for nidification.

The eggs, which are laid every other day and usually in the morning, are remarkable for their uniformity in shape, size and coloration. Of the 800 eggs I have seen there was hardly any variation in color, only a few millimeters in size and none in shape. The eggs are pear-shaped (pyriform), one end being narrow and pointed while the other is broad and bluntly rounded.

The Killdeer is about the size of a Robin, yet it lays an egg one-third larger. The average Killdeer egg measures 1.55" x 1.10", compared to 1.15" x .80" for a Robin. Eggs are placed with the pointed ends towards center to give the bird less space to cover while incubating. The eggs harmonize with their surroundings, the bird depending upon their protective coloration for concealment, like most species that nest in exposed places.

Infertile eggs are not rare. Few young die in the shell.

#### INCUBATION

Although incubation begins with the laying of the last egg, all the eggs do not hatch at the same time, there being an interval in a few nests of 3 days. Approximately 28 days is required for incubation, which is done by both birds. An unguarded nest is rarely found.

The parents remove the egg shells, usually shortly after the hatching of the chicks. I have, however, found one instance where half of a shell was allowed to remain in the nest for 6 hours with an unhatched egg.

Regardless of the stage of incubation, should the Killdeer lose a set of eggs it will lay another in about three weeks, usually near the site of the first nest; should the second set be lost a third will be laid after the same length of time in another field in the vicinity of the second nest.

I have several times seen its mate approach the nest while the Killdeer was brooding, and once I was surprised to see three birds at a nest—one upon the eggs and the others standing within a foot of it. At my approach only the brooding bird was not frightened away. In every instance it merely ran a few yards from the nest, teetering, and returned to it after I had passed by.

#### YOUNG

The young are hatched with eyes open and are clad in down. They are wet and weak and unable to stand up but are able to run about as soon as they are dry. Even after they are able to fly they depend upon their legs to escape, covering the ground with incredible speed for long distances without tiring. If closely pursued and almost overtaken, they take wing with loud cries.

I estimate that 80% of the eggs hatch, and 35% of the young reach maturity. There is a record of five eggs successfully hatching (Kohler, "Oologist," 1913, p. 24), which is unusual.

#### COURTSHIP

On the ground, the male runs crying before the female with drooping wings and tail spread out, fan-like, showing conspicuously the cinnamon band. The female usually appears indifferent to the display. Sometimes the pair crouches side by side, but facing in opposite directions, with drooping wings and outspread tails, teetering gently.

In the air, the male flies, high up, circling and crying, sometimes hovering motionless for many seconds like a Sparrow Hawk.

#### INJURY-FEIGNING

As an intruder approaches the nest, the bird flutters off a few feet with tail drooping and one wing hanging as if broken, uttering cries as if in distress. When pursued, it moves a few feet in the same manner and continues to flutter just beyond reach as the pursuer attempts capture, sometimes halting briefly to lie on its side with one wing poised. When the intruder has thus been lured some distance from the nest, the apparent suffering ceases and the bird flies off.

Another clever ruse to lure an enemy from its nest is accomplished by some birds which, when flushed from the nest, but not chased, will run about and squat down into hollows in the ground every few yards in an attempt to make the pursuer believe it had returned to the actual nest.

I have never seen a Killdeer display or feign injury at the approach of a dog to its nest. It runs away and usually escapes unseen, but if detected by the dog it will fly. At the approach of grazing cows, sheep or horses the bird will fly up into their faces, and the suddenness of the attack causes them to turn aside and pass by the nest (Taverner, P. A., *Auk*, 53, 1936; 366).

I once watched a setter dog chase a Killdeer into flight. This bird had young in a large field, and the dog watched the parent circling in the air for about 15 minutes. Every time the bird tried to alight the dog would flush it again, until finally the dog's owner called it away and the Killdeer rejoined its family.

Much has been written about the injury-feigning habit of the Killdeer, but ornithologists disagree as to the real cause of its conduct. All birds, however, do not feign injury when danger threatens their nests.

Julian Huxley (*Bird Watching and Bird Behavior*, 1930, p. 86) believes that "all evidence is against the bird having a conscious purpose or knowledge of what it is doing; the shamming recorded is an inborn pattern of behavior, like sneezing in ourselves."

W. H. Hudson (*Birds in Town and Village*, 1920, pp. 110-111) says the bird is not feigning at all, but ". . . is deliriously excited and has a fit . . .". Herbert Friedmann (*The Instinctive Emotional Life of Birds*, *Psychoanalytic Review*, 30 [3 and 4] 1934, p. 46) attributes injury feigning to a "struggle between fear and the reproductive emotions. This impels the bird to leave its nest, but the bond to the nest and eggs (or young) prevent the bird from doing so, and the result is a crippled departure."

Other ornithologists contend that the bird is paralyzed by fear which incapacitates it, and it has also been interpreted as a partial incapacitation by nervous shock and confusion. Injury feigning is generally considered as a reflex habit and I believe it is nothing else than this.

When young are near, the Killdeer will rarely display at the approach of an intruder. It will run about incessantly crying. If pursued, the bird may lead the intruder a long distance across fields. After a time it will suddenly take wing with louder cries and circle back to its young.

Some birds are very tame at their nests and others are wild and wary. The pair which nested in Summerdale (Philadelphia) in a burned over grass field for over a decade would never display at my approach whether the eggs were far advanced in incubation or the young just hatched. The incubating bird would invariably run off teetering as I came within 60 or 70 steps of it. If I followed, the bird would fly off into a near-by cornfield.

The incubating bird at another locality near Frankford (Philadelphia) would always leave the nest before I spied it. Neither of the pair ever feigned injury at this nest but kept close by, teetering continuously all the time I was at the nest.

Even after the nesting season the birds, when feeding in a field, will run around at the approach of an intruder, teetering as though they have a nest close by.

At Harrowgate (Philadelphia) where three pairs used to nest annually in a 100-acre field, the biggest nesting concentration noted, the birds never feigned injury when disturbed from the nest. They were frightened off regularly by pedestrians, boys playing baseball and running dogs.

I have never seen the male circling anxiously overhead, crying excitedly, as the female feigns injury at the nest, although this behavior has been mentioned by several writers.

#### GENERAL BEHAVIOR

To my mind the Killdeer is probably our handsomest shorebird. Its beauty is best seen when the bird displays. It is a graceful bird, agile, shy and wary at times, reluctant to fly, elusive and seductive, yet noisy—hence its specific name, *vociferus*. It is especially noisy during the nesting season, often flying about on moonlight night crying incessantly. It is quieter during the winter. It utters many kinds of notes, some sharp, shrill and penetrating and others soft, scarcely audible and endearing. It dislikes fields of tall herbage, is a fast runner, bobs its head occasionally, migrates by day and by night calling loudly, and does not intimately associate with other shorebirds but keeps aloof on the edges of the flocks. It is never found along wooded streams, nor does it congregate in flocks until after the nesting season.

The Killdeer is found from sea level to at least 6500 feet elevation, where I have seen them on the saline flats of San Luis Potosi, Mexico.

In bathing it wades sometimes belly deep, lies on its side and splashes water over its back and head by fluttering its wings. After being well soaked, it retires to a sunny spot to preen and dry.

Its flight resembles that of the smaller hawks, and it is sometimes mistaken for a Sparrow Hawk, Pigeon Hawk or Mourning Dove. It often hovers in the air over one spot, calling continuously.

#### FOOD HABITS

The Killdeer follows the plough and feeds on worms and grubs as well as grasshoppers and insect larvae.

Fifty years ago, before sanitary plumbing was generally installed in Philadelphia houses, sewage was carried to farms and stored in pits for use as fertilizer by farmers and truckers. These pits, about 30 feet in diameter and 6 in depth, were favorite feeding spots for the Killdeer and Solitary Sandpiper. The birds fed on the thousands of maggots infesting the pits and became exceedingly fat.

#### INTER-RELATIONSHIPS

In the Philadelphia region the only other species nesting in bare fields are the Prairie Horned Lark and the Nighthawk. I have seen both Killdeer and Horned Lark nesting in the same field, but the nests were over 100 yards apart.

In grass fields the Killdeer nests in close proximity to the Meadowlark, Vesper Sparrow and Grasshopper Sparrow. With all of these its relations are peaceful.

When feeding on tidal mud flats it pays no attention to the gulls and crows also feeding there.

It is said to nest in small colonies in the southwest, but I have never found two pairs nesting close together.

#### ENEMIES

Enemies of the Killdeer include man, by involuntary destruction of early nests by ploughing; cats and dogs, which destroy chicks before they are able to fly; rats, which steal eggs and capture chicks of dump-nesting birds; snakes; crows, which destroy eggs and chicks; and hawks. Fred Schmid observed a Pigeon Hawk with a Killdeer in its possession on April 18, 1947, at Lititz, Pa.

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#### THE COVER

The photograph was chosen from among several submitted by club members. It is our intention to follow this practice with each issue of *Cassinia*. John H. Arnett, whose print was selected, writes, "The picture of the Osprey was taken near Dubois, Wyoming, in August 1947, with an Argus O-3 on Kodachrome film. A black and white negative was made from the transparency. The bird was a young one and unable to fly at the time, so I decided I didn't need any blind; but just climbed up to the nest which, incidentally, was in a spruce tree at an altitude of about 7,000 feet in the Rockies."