

ing, because it arrived, as before remarked, towards the close of the prairie chicken season, when the great majority of our hunters were turning their attention to the next number on their seasonal program, namely, waterfowl shooting. The fact that the sharp-tail was with us only during late fall and winter, therefore, saved it from such wholesale destruction as befell the prairie chicken; but elsewhere, in the territory whence our local sharp-tails came, these birds had, perhaps, become more and more a substitute for the prairie chicken in the sportsmen's quest, and this may possibly have been one reason for the reduced numbers of the sharp-tails wintering in our section.

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## INCUBATION PERIOD OF THE KILLDEER

BY ALBERT F. GANIER

The unusually long incubation period of the Killdeer (*Oxyechus vociferus*), as well as other members of the plover family, has long been a matter of interest among ornithologists. When the bird student is first told that so small bird as the Killdeer has to incubate its eggs a week longer than does the ordinary hen, as likely as not he will ask, "What is the joke?" It may then be explained to him of course, that the process yields probably the most precocious day-old chick of any of our native birds.

Although I have found some thirty or forty Killdeer nests, it was not until 1929 that I had opportunity to personally make notes on their incubation period. The Knapp Farm pair is quite well known among our local bird group, some of whom might even claim to know them by their first names. Be that as it may, these Killdeers, year after year, nest on a rocky ledge in a well grazed pasture within 100 feet of a busy road. The nest can always be found within a space of thirty feet wide by 150 feet long and these birds are less wary than elsewhere.

The nest covered by the following observations was the third brood of the season and was found on June 13, at 6 P. M., when it held three eggs. The parent ran from the nest and the eggs were warm. On June 14, at the same hour, I visited the nest and found it to contain four eggs. These, when held in the cupped hand against the sun, showed only a trace of transparency, due to the very opaque nature of the shell. On my visit to the nest a week later this slight transparency had disappeared. I ceased my visits to the nest until the

eggs were nearly due to hatch. On July 12, at 6 p. m., I found the nest contained one egg and three very small young, apparently only a few hours old. They were entirely dry but their bills were laid flat on the ground as though they did not have strength as yet to lift their heads. The remaining egg was not pipped as yet. At 8 a. m. the following morning the egg had an aperture opened at the larger end on the top side. There were only two young in the nest and a brief search within a yard or so of the nest failed to reveal the missing youngster. At 2 p. m. I called and found the missing bird back in the nest. The young were perceptibly larger than they were the previous afternoon and held their heads clear of the ground. The egg was still unhatched and the aperture appeared to be no larger. I assume that this egg hatched during the late afternoon of that day, the 13th, for when I returned twenty-four hours later the nest was empty and no young were close by. While looking for the young I also searched for shells but neither on this nor on previous visits did I find that any had been left in or near the nest.

Assuming that incubation began on June 14, with the laying of the fourth egg, then the last egg took  $29\frac{1}{2}$  days to hatch while the others required 28. If, however, incubation commenced on June 13, with the laying of the third egg, then all required 29 to  $29\frac{1}{2}$  days to emerge from the shell. I think this is most likely what occurred. It is of interest to note that, although these eggs were incubated in mid-summer, with no benefit of shade and on a hot rocky situation, the incubation period was not at all shortened. It is likely that the three young first hatched were detained in the nest, perhaps a full day, to await the hatching of the last egg. Other observers record their leaving the nest within a few hours after hatching but I assume they meant after the hatching of the last egg.

On my last visit, the parents were not at the nest, as I walked briskly to it, but when I left a minute later one of them flew directly to it, presumably to tend the young hidden nearby. Ordinarily, Kill-deers will not return to their eggs until the observer is entirely out of sight. With the Knapp Farm pair, however, the sitting bird has been observed to remain on the eggs until approached to within seventy-five feet and return to them when I had retreated to 150 feet, though remaining in full view.

I have previously mentioned that this was the third brood for this pair. On March 30, I found their first nest, when it contained four eggs, and on April 20 the parents were observed tending small young nearby. It is likely that incubation began about March 20, which was

the date of beginning in 1928 and which is about a week ahead of the average date here. Incubation of the second set of four eggs began about May 3, from which it appears that only two weeks elapsed from the hatching of one set to beginning incubation of the next. Many of our Killdeer abandon nesting after the first brood, due to the fact that their nesting places become overgrown with grass and weeds and it therefore becomes difficult for them to rear their young. I believe that three broods in one season is unusual for this species. Subsequent observations showed that a fourth brood was not attempted although the nesting area still remained nearly bare and therefore suited for the purpose.

I find the following data on the incubation period of the Killdeer, in recent volumes of the WILSON BULLETIN:

Bates (V. 18, p. 150); gives 26 days to hatch out.

Sherman (V. 18, p. 196); gives 28 days to hatch out.

Spurrell (V. 29, p. 101); gives 24 to 25 days to hatch out, and states that the eggs were piped over three days before hatching.

Gabrielson (V. 34, p. 194); gives 25 days to hatch out.

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## UNILATERAL AND BILATERAL OVARIES IN RAPTORIAL BIRDS

BY F. L. FITZPATRICK

Some time ago the writer called attention to the fact that bilateral development of ovaries occurs in Cooper's Hawk (*Accipiter cooperi*), and cited the works of several investigators who have observed similar phenomena in European and North American species.<sup>1</sup>

In the case of Cooper's Hawk it was found that the adult female had bilateral ovaries, but only one oviduct, the left. There may have been a vestigial right oviduct, but such a structure was not observed. The left ovary was somewhat larger than the right ovary, and the left ovary contained more large follicles than did the right ovary. However, the smallest follicles in the right ovary appeared to be larger than the smallest follicles in the left ovary. This differs somewhat from the condition found by Kummerlöwe<sup>2</sup> in the adult female of *Accipiter nisus*.

Since this report was made, the writer has examined the urinogenital structures of a number of other species, through the courtesy

<sup>1</sup>Fitzpatrick, F. L. 1930. Bilateral ovaries in Cooper's hawk, with notes on kidney structure. Anatomical Record, Vol. 46, No. 4, p. 381.

<sup>2</sup>Kummerlöwe, Hans. 1931. Vergleichende untersuchungen über das gonadensystem weiblicher vögel, Teil III. Zeitschrift für mikroskopisch-anatomische Forschung, Bd. 24, Heft 4, S. 595-596.