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 Killdeers 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 pipped 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.[1]

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[2] 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

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

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

of Director Homer R. Dill of the State University of Iowa Museum, and Curator W. F. Kubichek of the Coe College Museum, who have coöperated in the work by furnishing specimens.

Four female specimens of the Eastern Red-tailed Hawk (*Buteo b. borealis*) have been examined, among others. In three of these cases there was but one ovary, the left. In the other instance, however, a vestigial right ovary was present. This vestigial right ovary consisted of only twenty-three follicles, and of course was far smaller than the right ovaries observed in Cooper's Hawk. It was attached loosely to the mesentery which characteristically lies between the kidneys and the ovary or ovaries.

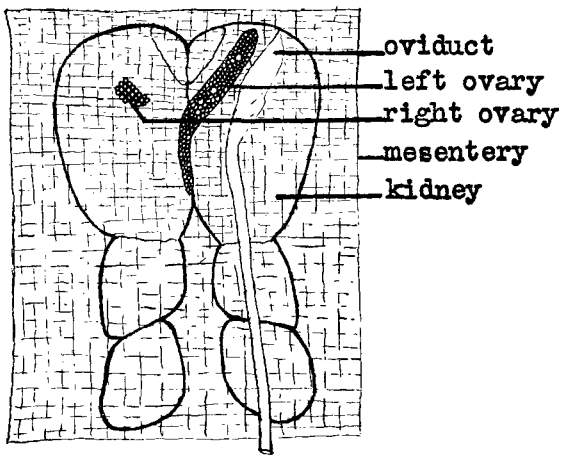

FIGURE 1. Diagram: relative positions and sizes of kidneys and reproductory structures in one specimen of Buteo b. borealis x 1/1.

It was suspected that this specimen of the Eastern Red-tailed Hawk having the vestigial right ovary might be an immature individual; that the vestigial right ovary might characteristically be present after hatching, but might be lost in later development. However, such did not appear to be the case in this instance at least. For a careful examination of the evidence indicated that all four specimens of the Eastern Red-tailed Hawk, including the individual with the vestigial right ovary, were in adult plumage.

Of course there also is the possibility that the presence or absence of a vestigial right ovary is a characteristic that is subject to variation in this species. Or perhaps the right ovary *does* develop in early stages, as in the embryos of the pigeon (*Columba livia domestica*) and the sparrow (*Passer domesticus*) reported upon by Kummer-

Other female hawks examined to date exhibited unilateral development of the ovaries. These were two adult specimens of the Northern Red-shouldered Hawk (*Buteo l. lineatus*), both in adult plumage. In addition, one adult female Turkey Vulture (*Cathartes aura septentrionalis*) also proved to have but one ovary, the left.

A number of female owls, all of which were adults, were examined, and in all cases these individuals had but one ovary, the left. There were no indications of right ovaries, even in vestigial form. The list is as follows.

Barred Owl (*Strix v. varia*)—2 specimens.

Great Horned Owl (*Bubo v. virginianus*)—2 specimens.

Snowy Owl (*Nyctea nyctea*)—2 specimens.

Western Horned Owl (*B. v. pallescens*)—1 specimen.

Screech Owl (*Otis asio*)—1 specimen.

Richardson's Owl (*Cryptoglaux funerea richardsoni*)—1 specimen.

As far as this evidence goes, it indicates that unilateral development of the ovaries is characteristic among adult females of the owl group.

Perhaps it is worthy of note that in all of the species referred to löwe,[3] and that there is progressive tendency toward reduction of these structures as development proceeds. It is suggested that the degree of reduction at any age might be subject to individual variation. At any rate, we are unable to generalize upon the basis of the data now at hand.

Meanwhile Snyder[4] has reported finding "paired ovaries" in one specimen of *Buteo borealis*.
above, there appeared to be but one oviduct, the left. The funnel of this oviduct opened adjacent to the mesentery on the ventral surface of the anterior lobe of the left kidney. From this point the oviduct extended posteriorly, held in place by the mesentery, to join the middle compartment of the cloaca (urodaeum).

Kummerlöwe's[5] more recent studies reveal that bilateral ovaries are developed during embryonic life in *Accipiter nisus* and that this condition also appears in the adult female. He reports bilateral ovaries in young females of *Accipiter gentilis* (L.), *Falco tinnunculus* (L.), and in an adult *Falco peregrinus* Tunst. (the right ovary probably could be called vestigial in this case). Snyder[6] has added to our data

[3]Krummerlöwe, Hans. 1930. Vergleichende untersuchungen über das gonadensystem weiblicher vögel, Teil I und II. Zeitschrift für mikroskopisch-anatomische Forschung, Bd. 21, Heft 1/3. und Bd. 22, Heft 1/3.

[4]Snyder, L. L. 1931. The Auk, Vol. 48, N. S. No. 1, p. 117.

[5]Ibid., 1931, pp. 570-613.

[6]Ibid., pp. 147-148.

upon this subject the observation of bilateral ovaries in another specimen of the Marsh Hawk (*Circus hudsonius*), "approximately" thirty specimens of the Sharp-shinned Hawk (*Accipiter velox*), "fewer" specimens of Cooper's Hawk (*Accipiter cooperi*) and one specimen each of the Red-tailed Hawk (previously noted), the Broad-winged Hawk (*Buteo platypterus*), and the Sparrow Hawk (*Falco sparverius*).

In so far as the evidence now available is concerned, it is apparent that bilateral ovaries occur in adult female hawks of certain species. Apparently this condition is common or even usual in some species and less common or rare in others. The relative size of the right ovary, when it is represented, appears to vary among different species. It would seem that both European and North American members of the genus *Accipiter* frequently exhibit bilateral ovaries in the adult condition, but certainly this condition is by no means confined to the genus *Accipiter*. In none of the nine adult female owls (five species) examined by the writer was any indication of bilateral development of the ovaries found.

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A LETTER TO THE GAME OFFICIALS OF THE STATE OF CONNECTICUT

BY MYRON E. STORY

The open duck season of the year 1933 is now a thing of the past and, as the result of my experience and observations, I am prompted to make a few comments about conditions in general, which I ask you to consider carefully as coming from a duck hunting sportsman, who is primarily interested in the saving of wild fowl from extermination and not "killing the limit" each time he goes after ducks.

My duck hunting is done in the territory near the mouth of the Connecticut River, in the vicinity of such places as Essex, Saybrook, and Great Island, and it is the "black duck" or "dusky mallard" to which my comments apply. The territory mentioned is typical of every other place on our coast where these ducks are found, and my statements will apply in general to all such places.

A few days before the season opened in October, I visited Great Island for the purpose of discovering where the ducks were most numerous and, although the Island has been so thoroughly drained that all of the old "saltholes" are now perfectly dry and the place is not nearly so attractive to the birds as it used to be, I found a generous supply of local ducks in the creeks on the Island. The birds were very