

FROM FIELD AND STUDY

Failure of Estrogen and Prolactin Treatment to Induce Brood Patch Formation in Brown-headed Cowbirds.—It is known that cowbirds and other birds practicing brood parasitism (Miller, *Scientific Monthly*, 62, 1946) fail to develop brood patches (Davis, *Wilson Bull.*, 57, 1945: 190). Since experiments by Bailey (*Condor*, 54, 1952:121-136) have indicated that brood patch formation in passerines depends on the synergistic action of estrogen and prolactin, the absence of a brood patch in the Brown-headed Cowbird (*Molothrus ater*) could be attributed to (1) insensitivity of the skin of the abdominal and breast areas to estrogen and/or prolactin, (2) insufficient production of one or both of these hormones, or (3) a combination of both factors. A deficiency of estrogen seems unlikely, and attention centers on prolactin, the pituitary hormone which also induces broodiness and other parental behavior in pigeons and chickens, since inadequate production of this hormone might also be an important factor in the development of the behavioral peculiarities of parasitic avian species.

In the course of studies on the behavior of cowbirds, their response to large doses of these hormones was tested in the following experiment performed on captive birds in the Biology Laboratory Building of the University of Texas, in Austin. On April 30, 1959, 3 mg. pellets of estradiol (Progynon, Schering) were implanted subcutaneously in the necks of four adult females, four adult males, and a bilaterally castrated adult male of *Molothrus ater*; and a pellet was also implanted in an adult male domestic Canary (*Serinus canaria*). Seven days later, the Canary had a defeathered, highly vascular, and moderately edematous brood patch, but the cowbirds exhibited no response. From June 23 through July 1, two female and one intact male estradiol-implanted cowbirds were given daily intramuscular or subcutaneous injections of 50 I.U. (as 0.05 ml. of aqueous solution) of prolactin (Panlitar, Armour), the potency of which was confirmed by the standard pigeon crop-sac assay method. At the time of prolactin treatment, the estradiol pellets were still visible through the neck skin. No defeathering, increase in vascularity, or edema was noted in the cowbirds.

Working with fringillids, Bailey (*op. cit.*) obtained complete brood patch formation with estradiol treatment alone and provided experimental evidence suggesting that estrogen acts to induce secretion of prolactin by the pituitary. His experiments with hypophysectomized individuals suggest that estrogen initiates the vascular response, while prolactin is responsible for defeathering and edema.

The present work would seem to indicate that the skin of the abdominal and breast areas of the Brown-headed Cowbird is insensitive to estrogen and prolactin. Recently, E. O. Höhn (*Nature, in press*) has shown that the pituitaries of breeding Brown-headed Cowbirds produce prolactin in amounts comparable to those produced by pituitaries of breeding female Redwinged Blackbirds (*Agelaius phoeniceus*), a related, non-parasitic species of similar size in which females have brood patches. Höhn's work nicely supports the conclusion suggested by the present study, namely, that the absence of a brood patch in parasitic cowbirds is attributable not to a deficiency of prolactin or estrogen but, rather, to a failure of tissues in the brood patch region to respond to these hormones.

It would be interesting to compare the behavior of hormone-treated and untreated female cowbirds. One of my females treated with estradiol, but not with prolactin, repeatedly manipulated straw and small twigs, defended a nest-shaped wire feeding cup against another female, and made brief nest-molding movements while sitting in the cup. There are several reports of female Brown-headed Cowbirds feeding juvenal cowbirds (Bent, *U.S. Nat. Mus. Bull.* 211, 1958:441-442). With proper hormone treatment, it is possible that other latent nesting and parental behavior could be induced in *Molothrus ater*.

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Elegant Tern and Royal Tern Nesting in California.—In the spring of 1959 the Elegant Tern (*Thalasseus elegans*) and the Royal Tern (*Thalasseus maximus*) nested on a dike at the salt works at the south end of San Diego Bay, San Diego County, California. Heretofore these species have not been known to nest in California. Evidently they have colonized the San Diego area from the breeding colonies that have existed for many years 350 miles to the south in central Baja California, as at Scammons Lagoon.

The tern colony was first found on May 2, when five nests of the Elegant Tern were noted, each with one egg. On May 6 there were seven nests; May 9, 14 nests; May 12, 20 nests; May 16, 27 nests: