

crease in weight, histological changes and a marked drop in the iodine content, though to a lesser degree than the whole suspension.

## 5856

**Precocious Development of Sexual Characters in the Fowl by Homeoplastic Hypophyseal Implants. I. The Male.\***

L. V. DOMM. (Introduced by Frank R. Lillie.)

*From the Whitman Laboratory of Experimental Zoology, University of Chicago.*

A series of light brown Leghorn cockerels ranging from 22 to 86 days in age were given daily subcutaneous homeoplastic hypophyseal implants. In the first experiment the entire hypophysis was utilized while in subsequent tests only the anterior lobe was employed. The number of daily implants per bird varied from 19 to 28. The treated birds, as well as controls, were weighed and the head furnishings measured at regular intervals, at first daily, later on alternate days. All treated individuals remained active and in excellent condition throughout the experiments so that they could not be distinguished from controls in this respect. In fact treated males were consistently somewhat heavier than their respective controls when treatments were discontinued.

One of the effects, quite apparent after 4 to 5 days' treatment, was a stimulation of head furnishings. These became turgid and reddish in color and revealed noticeable growth. In the longer treatments there was a noticeable slackening in growth toward the close of the experiment while in some of these there was a cessation followed by a slight regression in size. Bird No. 167, 59 days old when the experiment began, received 23 daily implants. On the day the experiment started its comb measured 4.7 cm. in length and 2.6 cm. in height, while 15 days later it measured 7.5 cm. in length and 4.5 cm. in height, the maximum size attained. On the day following the last implantation, 24th day of the experiment, when the bird was killed, measurements of comb were 6.8 cm. in length and 4.0 cm. in height. The best control comb showed a gradual increase during this period from 4.5 cm. in length by 2.6 cm. in height to 5.8 cm. in length by 3.5 cm. in height. Precocious sexual behavior

---

\* This investigation was supported in part by a grant from the committee for Research in Problems of Sex of the National Research Council; grant administered by Prof. Frank R. Lillie.

was very evident in the older individuals treated which were known to crow and tread. No modifications were observed in either plumage or spurs.

Post-mortem examination revealed pronounced hypertrophy of testes in all treated individuals. These modifications can perhaps be best appreciated by concrete data on an average case. Bird No. 182, 39 days old when experiment began, received 19 daily implants and was killed on the day following the last implantation. The right testis measured 1.2 cm. in length and 0.7 cm. in width, while the left measured 1.4 cm. in length and 0.6 cm. in width. Measurements of the best developed control gonads were right 0.9 cm. in length by 0.3 cm. in width, left 0.9\* cm. in length by 0.3 cm. in width. Hypertrophy of *ductus deferens* was not pronounced. Macroscopically such organs as the thyroids, spleen and liver showed little if any modification. Thyroids were small and difficult to find in treated as well as control individuals.

Histological examination of testes revealed very significant modifications. Whereas controls showed juvenile tubules in various stages of development, the tubules of treated individuals in all cases were greatly advanced with the older cases showing complete spermatogenesis with an abundance of mature sperm. This condition normally would not have occurred until the birds were many weeks older. The amount of interstitial tissue in proportion to tubules seemed no greater in treated individuals than in controls. No histological difference could be detected between the thyroids of treated and control individuals.

Hypophyses were obtained from mature cocks, hens, and capons, though these were not used indiscriminately, care being taken to utilize the glands from a particular sexual type exclusively in any one experiment. There is some evidence indicating that the hypophysis of the capon is most effective, that of the hen least. The effects appeared to be similar whether the entire hypophysis or merely the anterior lobe was employed.

It is assumed that the gonad-stimulating substances of the introduced pituitary anterior lobe acted directly on the testes and these in turn are responsible for the precocious development of the other sexual characters.

Preliminary experiments in collaboration with Dr. H. B. Van Dyke using a purified gonad-stimulating hormone prepared from sheep pituitary glands yield even more pronounced effects in some respects.