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On the Question of Equipotentiality of the Spurs in the Leghorn Fowl.*

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In previous communications[1, 2] it has been shown that the spurs of the two sexes do not react equally to the sex hosts once the chick is hatched. Spurs from either sex grafted to the male host were for the most part of the male type but on the female each was characteristic of its sex. This might be explained either on the basis of a conditioning of the male spur by the male hormone prior to the time of hatching or on the basis of a genetic difference in the spurs of the two sexes.

In an effort to determine whether the spurs of the female can be conditioned by the male hormone and whether a spur will continue to develop in the presence of the female hormone after growth has begun as maintained by Goodale[3] and Domm,[4] spurs from females were grafted to male hosts and after varying periods were transplanted back to the original donors. Complete records are available for 9 experiments, 7 between infant chicks and 2 between adult birds. Of the experiments between infant chicks, one spur was taken from a chick the day of hatching, 4 from day-old chicks, one from a 2-day old chick, and one from a 4-day old chick. These were allowed to grow on male hosts during periods varying from 14 to 24 days before they were transplanted back to the original donors. Between the adults, the one spur was allowed to remain on the male host 8 weeks, during which time it increased 3.0 mm. in length; the other remained 14 weeks, during which time its length increased by 3.5 mm. In all the experiments between the infant chicks, the spurs developed into normal female spurs. Those between the adults regressed slightly after they had been transplanted back to the original donors. At the termination of the experiment, which lasted 7 and 4 months respectively after the second transplantation, they

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[1] Kozelka, A. W., *J. Heredity*, 1929, **20**, 1.

[2] Kozelka, A. W., *J. Exp. Zool.*, 1932, **61**, 431.

[3] Goodale, H. D., Carnegie Inst. of Washington, 1916, 243.

[4] Domm, L. V., *J. Exp. Zool.*, 1927, **48**, 31.

approximated the size of a normal female spur. This subsequent reduction in size of the spur was undoubtedly due to the natural wear on the spur.

It is evident from these experiments that the male hormone does not influence the female spur once the chick is hatched. Nor does it appear probable from the 2 experiments with the adult birds that the female spur continues to develop in the presence of a normal ovary once growth has begun. The fact that the spur continues to develop in the poulard even after the plumage has reverted to the female type and not in the normal female would indicate that the threshold level of the female hormone necessary to inhibit the development of the female spur is high. It may still be possible that the spur is subjected to conditioning only during an early critical period of development, at the time the primordial cells of the spur are determined. But the fact that the female spur is capable of developing at any stage in the life of the bird, would indicate that it remains in an embryonic condition and should therefore be subjected to the influence of the male hormone even after hatching. While these facts favor the theory that the difference in the behavior of the spurs is due to a genetic difference rather than to a conditioning of the male spur by the male hormone, the final answer as to the equipotentiality of the spurs in the two sexes cannot be made until critical data on the effects of the male hormone on the primordium of the female spur has been obtained. Work is now in progress on this phase of the problem.

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Implantation of Pineal Glands in the Leghorn Fowl.*

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Foà[1] reported a precocious development of the secondary sex structures in pinealectomized males of the domestic fowl. The growth of the body of the cockerels was retarded during the first

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[1] Foà, C., *Arch. Ital. de Biol.*, 1914, **61**, 79.