THE EFFECT OF YOLK INJECTIONS ON THE PLUMAGE OF AN OVARIOTOMISED BROWN LEGHORN HEN.

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With 23 figures in the text.

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Introduction.

FELLNER (1925) succeeded in demonstrating that the lipoids obtained from the eggs of hens, when injected subcutaneously in rabbits, showed the same positive influence on the growth of the uterus as do the lipoids from the reproductive organs of mammals.

The question arises whether the egg yolk contains a substance capable of conditioning in the fowl the expression of another type of female secondary sexual character, namely those plumage differences relating chiefly to structure and colour of feathers which distinguish female and male in most breeds of the domestic fowl.

It has been shown experimentally that the plumage of the Brown Leghorn female is dependent on the presence of the ovary: the removal of the sex gland results in the appearance of the male type of plumage. This is usually replaced later by the female type which is now dependent for its expression on the development of a right gonad (DOMM, 1927). The removal of the ovary from the bird used in this experiment, however, did not result in the resuscitation of the right gonad, and the male plumage assumed when it became adult, persisted until the experiment was begun.

Material.

The bird was hatched in June 1926. At ten days old the ovary was removed. When the adult plumage was assumed the bird was typically female; the head furnishings, comb and wattles, however, were small and pale as is the case with birds from which the reproductive tissue has been completely removed. The plumage characteristics then changed and new feathers growing in were typically male in coloration and structure. When examined in March 1927 the bird showed a mosaic of male and female feathering all over the body. At this time groups of

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feathers were removed from the various regions of the body which exhibited marked dimorphism with regard to colour, or to colour and structure. The areas which were in the cape, breast, saddle and wing were marked by tattooing round the follicles from which the feathers were removed by Indian Ink.

All feathers growing in the marked areas from March 1927 onwards were typically male both in structure and colour. An exploratory operation was performed on the 5th April, 1927 but no reproductive tissue could be found. This was expected since at no time subsequent to the initial operation for the removal of the ovary had the head furnishings showed any indication of reproductive tissue in the body of the bird.

Up to the time of yolk injections on the 17th October, 1927 successive feathers from follicles in marked areas were typically male. As they became mature (usually after a period of 6 weeks or so) the feathers were removed and filed for reference.

Technique.

The preparation of the material was as follows:

A newly laid egg of a Brown Leghorn was obtained and after washing the shell with 70% alcohol it was broken into a sterile dish. The albumen was separated from the yolk and the yolk beaten up with 5 ccm. of sterile Ringer’s solution. The mixture was then injected either subcutaneously or intra abdominally.

Altogether five egg yolks were injected at different periods covering in all 20 days.

17. X. 1927 — Abdominally
21. X. 1927 — Subcutaneously
25. X. 1927 — Abdominally
31. X. 1927 — Abdominally
5. XI. 1927 — Abdominally.

Results.

On the 13th December, 1927 it was noticed that the almost fully grown feathers in the shoulder region showed some female characteristics. The effect of the injections was first noted then, 38 days after the last injection of yolk. In the marked areas, feathers succeeding those plucked on the 14th November, 1927 showed, when fully developed and plucked on the 17th January, 1928 marked female characteristics.

I. Breast.

The structure of the breast feathers in the male and female of the Brown Leghorn are similar but they differ markedly in colour; in the former they are black, in the latter, salmon.

The fully grown breast feather plucked on the 14th November, 1927, was typically male. That plucked on the 17th January, 1928, however, showed some femaleness in that the apical third of the feather had a narrow border of salmon, the rest of the feather being black. In the succeeding feather from the same follicle plucked on the 6th March, 1928, the femaleness was more marked — there was a more extensive salmon