opened at about the same time and the ovaries were weighed one day later. A comparison of the weight of the ovaries from animals which received implants from control and experimental male donors demonstrated that the ovaries of the experimental recipients weighed 28% less than the ovaries of the controls. The ovaries of the experimental recipients which received pituitaries from oestrin injected castrate females weighed 35% less than the ovaries of the control recipients.

The data from the experiments on the immature rats demonstrate that the oestrous producing hormone inhibits the normal development of the ovary and decreases the gonad stimulating power of the hypophysis. This suggests that the influence of oestrin on the ovaries of immature animals is due to its action on the hypophysis.

The results obtained in the experiments on the adult castrate males and females, demonstrate that oestrin as administered decreases the gonad stimulating power of the hypophysis and that the hypophysis of the female seems to be more susceptible to the oestrous producing hormone than that of the male. Whether the oestrin inhibits the production or storage of the gonad stimulating substance of the anterior lobe of the hypophysis is now being investigated.

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The Ciliary Systems in the Oviduct of the Pigeon.*

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Over a year ago I described the ciliary systems in the oviducts of the painted turtle.[1, 2] These ducts are lined from the infundibulum to the distal outlet with ciliated epithelium. In the proximal portion of the ducts the cilia form two systems, a general one, the abovarian, which sweeps from the ovary toward the exterior and which covers most of the inner surface of the duct, and a restricted one, the proovarian, a narrow longitudinal band not more than 2 mm. wide, in which the cilia beat toward the ovary. As was pointed out in these earlier publications, the spermatozoa can make no headway against

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[1] Parker, G. H., PROC. SOC. EXP. BIOL. AND MED., 1928, xxvi, 52.

[2] Parker, G. H., *Am. J. Physiol.*, 1928, lxxxvii, 93.

either of these systems but are swept up or down the duct in accordance with the system with which they are associated. It is clear from the action of these cilia that the pro-ovarian system must be concerned with the transportation of the sperm cells to the ovary and the abovarian with the clearing of the oviducts and possibly with the transportation of the eggs toward the exterior. It is a matter of interest to ascertain to what extent these two systems are represented in the birds and in the mammals.

The oviduct of the pigeon was studied with this question in mind. It is comparatively easy in this oviduct to distinguish the 5 conventional parts, namely, the infundibulum next the ovary, the extensive albumen-producing portion of the duct, the somewhat restricted isthmus, the so-called uterus or shell-producing part, and, at the distal end, the vagina. All these parts in the pigeon as in the turtle are covered with a ciliated epithelium whose cilia for the most part beat from the interior toward the exterior. They, therefore, reproduce what has been called in the turtle, the abovarian system. Over the albumen-producing portion of the duct a second system can easily be detected. This system is a band of approximately one-fourth the width of the duct in which the cilia persistently beat toward the ovary. It, therefore, reproduces the pro-ovarian system of the reptile. It is best demonstrated by exposing a transverse section of the appropriate portion of the oviduct by longitudinal splitting and by inspecting under the microscope the edge of the tissue when folded upon itself parallel to the length of the duct. By rolling such a preparation upon itself one may pass with ease from regions in which the cilia are seen to beat toward the exterior to those in which they beat toward the ovary. Thus the albumen-producing portion of the oviduct in the pigeon reproduces with great completeness the conditions found in the turtle.

If portions of the albumen-producing section of the pigeon's duct are exposed so that the complete transverse extent of the duct is open to view and the preparation is flooded with Ringer's solution and carmine, a close inspection under the microscope shows a pro-ovarian current on part of the wall and an abovarian current over most of it.

Spermatozoa placed in contact with either of these ciliary systems are swept in appropriate directions up or down the tube irrespective of the proper locomotion of the spermatozoa themselves. It is, therefore, plain that in the pigeon, as in the turtle, the spermatozoa must be carried from approximately the middle of the tube toward the ovary by the pro-ovarian system. How the sperm cells

reach this system from the lower part of the tube where they are deposited by the male is not wholly clear. There is much evidence to show that the oviduct of the bird exhibits more or less antiperistalsis. This activity has been called upon as an explanation of the formation of certain types of double eggs in that an egg fully formed and near the exit of the oviduct is by means of antiperistalsis returned to the upper part of the tube to be incorporated in a second egg in process of formation. The fact that feathers and other barnyard refuse may be occasionally included in eggs, as pointed out by Landois,[3] is to be explained by antiperistalsis. Probably antiperistalsis, associated with the locomotor activities of the spermatozoa themselves, accounts for the transfer of these cells from the position of their deposit at the distal end of the duct to the beginning of the pro-ovarian ciliary system by which they would then be carried to the neighborhood of the ovary.

In conclusion, it may be stated that the pigeon possesses in its oviduct in addition to the abovarian system of cilia a pro-ovarian system like that of the turtle except that it is somewhat more restricted.

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Effect of the Luxus Consumption of Meat Upon the Kidney of the Albino Rat.

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During the course of investigations on the effect of high protein (meat) diet on growth,[1] voluntary activity,[2] and nitrogen excretion during a fast,[3] some 43 animals became available for pathological examination. Of these animals 23 belonged to the high protein group, while the remaining 20 were controls. The two groups were of approximately the same age, but as a result of the difference in diet the high protein animals were about 20% heavier than the controls. The control animals were fed on our regular stock diet which consists of whole wheat flour, 62.5%, dry casein, 15%, skim milk powder (analac), 15%,

[3] Landois, H., *Fremde Einschlüsse in Huhnereiern.* 1882. Humboldt, i, 22.

[1] Hitchcock, F. A., *Am. J. Physiol.*, 1926, lxxix, 218.

[2] Hitchcock, F. A., *Am. J. Physiol.*, 1926, lxxix, 206.

[3] Hitchcock, F. A., and Rawlins, A. L., *Am. J. Physiol.*, 1927, lxxx, 450.