weeks failed to perceptibly diminish the excretory function of the kidney for phenolsulphonphthalein.

It is obvious that the results of these 2 series of experiments on rabbits were consistent with each other in showing that large repeated doses of dinitrophenol did not impair the functional efficiency of the kidneys.

Conclusions. 1. Daily subcutaneous injections in rabbits of alpha dinitrophenol in doses up to and including fatal ones, and for as long as 77 days, did not modify renal function as indicated by quantitative counts of the formed elements in the urinary sediment, according to Addis' method, and by excretion of phenolsulphonphthalein. 2. Therefore, it is unlikely that dinitrophenol, in ordinary clinical dosage, will injure the kidneys.

7485 C

Sex-Limitation of Cilia in Body Cavity of the Frog (R. pipiens).

J. KENNETH DONAHUE. (Introduced by W. W. Swingle.)

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The occurrence of ciliary systems in the peritoneal lining of the body cavity of the frog has long been known (Gray[1]) but, so far as the writer is aware, the fact that they are sex-limited and appear only in the female has hitherto been unrecognized. However a comparative study of the peritoneal lining of the body cavities of 20 female and 20 male frogs *(R. pipiens)* has shown that such ciliation occurs only in the female and may be regarded as being strictly sex-limited. This study was made on frogs taken during the breeding season (April-May) at which time the ovaries of the females were greatly enlarged. Strips of the thin peritoneal lining were removed and temporarily mounted in frog Ringer for examination. The cilia show up clearly when illuminated by unfiltered light and with the diaphragm of the microscope almost completely closed. An 8 mm. objective combined with a No. 18 eyepiece proved to be the most adequate lens combination for this type of work. In the female frog ciliary systems are present throughout the ventral and lateral areas of the peritoneum, extending the entire length of the body cavity and including the pericardial region; they are particularly numerous in the peritoneal tissue immediately adjacent to the

[1] Gray, J., Ciliary Movement, 1928, Cambridge University Press, p. 163.

ventral abdominal vein. The ciliary beat is in an anterior direction (towards the ostia tubae). By this means the movement of the ova towards the ostia is facilitated. Since frogs kept in captivity do not ovulate, the actual transportation of the ova was not observed. In a similar study on 20 male frogs it was found that cilia were entirely absent from all parts of the peritoneal lining.

That the ciliation found in the peritoneal lining of the female frog might be under hormonal control seemed likely. Previously Wolf[2] showed that castration atrophy of the oviducts of the female *R. pipiens* could be prevented by daily injections (2 RU) of mammalian follicular hormone. In order to ascertain the possible relation of peritoneal ciliation to the follicular hormone a series of mature, intact male frogs were injected with 5 RU of theelin* intraperitoneally daily for varying intervals. Frog T1, examined after 9 daily injections, showed no cilia in the peritoneal lining. Frog T2 was examined after 15 daily injections and showed very small patches of active cilia in scattered regions of the peritoneal lining. Frog T3, examined 20 days after injection was initiated, revealed numerous patches of active cilia in the peritoneal lining. Frog T4, upon examination 25 days after the initial injection, showed active cilia in numerous areas of the peritoneal lining. Frog T5, examined the day following the thirtieth injection showed ciliated areas in the peritoneal lining. It should be emphasized that in the above-mentioned cases the ciliation produced by theelin did not compare with the condition found in the normal female where practically all parts of the peritoneal lining are ciliated. Doubtless a longer injection period would bring about a condition in the male frog more comparable with that seen in the female. Fifteen untreated males were examined as controls and in no instance were cilia found in the peritoneum. It appears evident from these experiments that the follicular hormone is capable of producing ciliation of the peritoneum in the male frog. It follows from this that the absence of such ciliation in the untreated male is due to a lack of follicular hormone.

The ineffectiveness of Antuitrin S in inducing ovulation in the female and amplexus in the male frog has been mentioned by Rugh.[3] In order to test its effectiveness in producing ciliation of the peritoneal lining of the male frog 4 adult males were injected with 5

[2] Wolf, O. M., *Anat. Rec.*, 1928, **41**, 41.

* Theelin and Antuitrin S supplied through the courtesy of Dr. O. Kamm of Parke Davis & Co.

[3] Rugh, R., *Biol. Bull.*, 1934, **66**, 22.

RU of Antuitrin S* daily for 5 days after which the dosage was increased to 10 RU daily until 25 days had elapsed. Examination of the peritoneal linings at that time showed that ciliation had not occurred in any region.

7486 C

Volume and Total Number of Glomeruli in Kidney of White Rat Estimated by Precision Methods.

ROBERT TENNANT AND WILLIAM R. THOMPSON. (Introduced by Raymond Hussey.)

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The general principles of measurement of microscopic figures by projectometric methods have been treated in another communication,[1] and applications to the measurement of islands of Langerhans in the pancreas have been presented.[2, 3] The greatest difficulty in this work was due to the enormous variations in their volume and shape. Since this difficulty was far less evident in the case of the glomeruli of the kidney an investigation of this field seemed indicated, and we wish to give at present some of the results so far obtained.

It has been thought preferable to make estimates free from the assumption of spherical form for glomeruli wherever possible, but to use this to furnish an independent check. However, in the material used, it was found that areas of glomerular *particles* in sections (7 micra thick) could be approximated satisfactorily by comparison of their projected images with circles of known size; and this was done rather than trace and measure them with a planimeter. A glomerulus was considered to *belong* (in the sense previously[1] defined for *islets*) to a given section if its greatest cross-sectional area lie therein. Thus it was possible from random samples and assumption of approximate spherical form to estimate directly mean volume and diameter of glomeruli in a given region. However, we are interested in data more comprehensive than this, and, if possible, free from the assumption of sphericality; *e. g.*, total glomerular tissue volume (I_s) in the sample region. Previous

1 Thompson, W. R., *Biometrika*, 1932, **24**, 21.

2 Thompson, W. R., Hussey, R., *et al.*, *Biometrika*, 1932, **24**, 27.

3 Thompson, W. R., Tennant, R., and Hussey, R., *Science*, 1933, **78**, 270.