

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,<sup>3</sup> 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.

## 4926

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

ROBERT A. MOORE AND F. A. HITCHCOCK.

*From the Departments of Pathology and Physiology, Ohio State University.*

During the course of investigations on the effect of high protein (meat) diet on growth,<sup>1</sup> voluntary activity,<sup>2</sup> and nitrogen excretion during a fast,<sup>3</sup> 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%,

<sup>3</sup> Landois, H., *Fremde Einschlüsse in Huhnereiern*. 1882. Humboldt, i, 22.

<sup>1</sup> Hitchcock, F. A., *Am. J. Physiol.*, 1926, lxxix, 218.

<sup>2</sup> Hitchcock, F. A., *Am. J. Physiol.*, 1926, lxxix, 206.

<sup>3</sup> Hitchcock, F. A., and Rawlins, A. L., *Am. J. Physiol.*, 1927, lxxx, 450.

CaCO<sub>3</sub>, 1.5%, cotton seed oil 5% and water, 10%. To this mixture an appropriate amount of cod liver oil was added. We have computed that this ration contains 29% protein, 57% carbohydrate, and 14% fat. Each animal in the experimental group in addition to this stock ration was given daily, 8 gm. of fresh lean beef cooked rare. The average food intake of the control group was 14.4 gm. daily, which equaled 55 calories, 29% of which was furnished by protein. Each experimental animal in addition to its 8 gm. of meat, ate 12.4 gm. of the stock ration daily. This made a total daily caloric intake of 64 calories, 36% of which was furnished by protein. The average daily urinary nitrogen for the control group was 0.78 mgm. while for the experimental group it was 1.51 mgm. per gram of body weight.

Dr. R. R. Durant determined, by the direct method, the blood pressure of 8 of the control and 7 of the experimental animals. In the control group systolic pressure varied from 102 to 130, with an average of 120 mm. of mercury. With the experimental animals the variation was from 103 to 129, with an average of 115 mm. of mercury. These figures do not vary significantly from the normal values for the blood pressure of the white rat as reported by Durant.<sup>4</sup>

Kidney weights were determined on 8 of the control and all of the experimental animals. These weights expressed in percentage of total body weight varied for the controls from 0.62 to 0.70% with an arithmetical mean of 0.64%. For the experimental group the variation was from 0.67 to 0.90% with an arithmetical mean of 0.73%. The overlapping was minimal. Only one control animal was equal to, or greater than, the lowest experimental animal while only 5 experimental animals were equal to, or lower than, the highest control. The average weight of the kidneys of the experimental group was 14% higher than that of the controls. This is 2.2 times greater than the probable error and the difference is therefore significant.

Histological examination was made of both kidneys of all animals. All of the animals in the control group showed normal kidneys. Of the experimental animals 17, or 74%, showed some pathological change. These changes consisted of focal areas of fibrosis and cellular infiltration in the cortex, dilatation of the cortical tubules with hyaline casts, and slight to moderate thickening of Bowman's capsule. None of these changes is analogous to human chronic diffuse glomerulonephritis.

We conclude, therefore, that in the albino rat a high protein

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<sup>4</sup> Durant, R. R., *Am. J. Physiol.*, 1927, lxxxi, 679.

(meat) diet produces (1) no change in systolic blood pressure; (2) a hypertrophy of the renal substance; and (3) certain histological changes of a pathological nature which are not, however, analogous to chronic nephritis in man.

## 4927

**Serum Calcium and Phosphorus of Guinea Pigs after Administration of Single and Repeated Doses of Parathormone.**

AARON BODANSKY, JOHN E. BLAIR AND HENRY L. JAFFE.

*From the Laboratory Division, Hospital for Joint Diseases, New York City.*

The tendency has been to assume that hyperparathyroidism is consistently associated with hypercalcemia. We emphasize that frequently this is not the case, that hypercalcemia is not a sole criterion of hyperparathyroidism. Recorded instances of absence of hypercalcemia after parathyroid administration have sometimes been noted as merely paradoxical. The suggestion of "immunity" to parathormone is not supported by the data. On the other hand, the suggestion that an increased rate of excretion may prevent the accumulation of calcium in the blood is plausible. And a generalization (based on work with rodents) that herbivora are very resistant to parathormone injections implies an effect of diet on serum calcium response. However, the resistance of the cat would have to be explained on a different basis.

It has been established that in mice, rats and rabbits relatively small, if any, effects upon serum calcium are produced by administration of relatively huge doses of parathormone. Negative results in guinea pigs were reported by Macleod and Taylor<sup>1</sup> and Taylor.<sup>2</sup>

We found that in guinea pigs consistent effects upon serum calcium and phosphorus could be produced only by very large doses; that these effects could be brought out more prominently, in young animals, after starvation; and that with doses not sufficiently great to produce effects on serum calcium and phosphorus, calcium mobilization and excretion could be demonstrated.

*Controls.* Normal guinea pigs, young and adult, fed and starved, showed a serum calcium of  $10.4 \pm 1.0$  mg. per 100 cc. The serum phosphorus varied from about 8.0 mg. in guinea pigs weighing

<sup>1</sup> Macleod, J. J. R., and Taylor, N. B., *Trans. Roy. Soc. Can.*, 1925, xix (Sect. V), 27.

<sup>2</sup> Taylor, N. B., *Am. J. Physiol.*, 1926, lxxvi, 221.