taken 6 hours after induction of anesthesia, and show some augmentation over those of untreated controls up to the 18th hour after anesthesia. These definite and regular biochemical corollaries of the functional disturbance in ether anesthesia are not also found uniformly reflected in the urinary excretion of putrefactive bodies by surgical patients.

8985 P

## Response of Chick Testes and Ovaries to Rat Pituitary Implants.*

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Implants of rat pituitaries were made into 98 male and 40 female chicks as part of a program of study of the pituitary-gonad inter-relationship. The results were unexpected, and we believe of general interest because of possible bearing on the problem of species specificity of hormone action. The bird affords an excellent test for experiments involving pituitary hormones of animals in different classes because: (1) of the marked response of the immature testis to the "follicle stimulating" hormone (F.S.H.),[1] and, (2) since it was reported by one of us,[2] that the testes of chicks given the pituitary luteinizing principle differed histologically from those of chicks which received F.S.H.

Young adult rats weighing 180-225 gm. were used as donors and those castrated were operated upon 9 weeks previous to the time of implantation. Weights of pituitaries used corresponded closely to those tabulated for Wistar rats of similar weight.[3] Single pituitaries were implanted subcutaneously into the chicks on the 5th and 7th days after hatching and the birds were killed on the 9th day. Control experiments with implants into immature female rats demonstrated the same quantitative difference in ovarian weights which has been reported by other workers.[4] A summary of the results in the chick appears in Table I.

*Contribution No. 74 from the Waterman Institute, and No. 262 from the Zoology Department of Indiana University.

1 Riddle, O., and Bates, Robert W., *Endocrinology*, 1933, **17**, 689.

2 Breneman, W. R., *Anat. Rec.*, 1936, **64**, 211.

3 Donaldson, H. H., 1924, *The Rat*, Philadelphia, 256.

4 Evans, H. M., and Simpson, M. E., *Am. J. Physiol.*, 1929, **89**, 371.

These data indicate quite definitely that the increased weight observed for the testes and ovaries did not demonstrate the striking differential weight increment found when immature female rats were recipients of implants. There was moreover, no statistically significant difference between the averages of the various male or female groups. In contrast to the rat, the heaviest gonads occurred in cockerels which were given pituitary implants from normal females. Four pairs of testes weighed respectively 57.4 mg., 46.2 mg., 46 mg., and 45 mg. (exceeding the maximum for all other series, namely, 39 mg.). This observation necessitates further check to determine if the stage of the reproductive cycle influenced the physiological action of the female pituitaries in these experiments.

TABLE I.
Weight Response of Chick Gonads to Subcutaneous Pituitary Implants.
Gonad weights are in mg. for the 2 testes or for the left ovary.

| Implant | No. | Range | Aver. |
|---|---|---|---|
| | | Male Chicks. | |
| None | 23 | 6.0-21.5 | 11.12±0.96 |
| ♀ | 38 | 8.1-57.4 | 21.28±1.62 |
| ♀* | 17 | 14.0-31.5 | 21.51±1.24 |
| ♂ | 24 | 14.0-34.8 | 20.48±0.87 |
| ♂* | 19 | 14.5-39.0 | 22.16±1.38 |
| | | Female Chicks. | |
| None | 15 | 7.0-16.0 | 11.35±0.68 |
| ♀ | 11 | 11.5-21.5 | 16.69±0.93 |
| ♀* | 10 | 10.0-20.0 | 14.99±0.94 |
| ♂ | 8 | 10.5-20.5 | 16.66±1.13 |
| ♂* | 11 | 13.0-21.5 | 17.32±0.71 |

*Castrated.

It was noteworthy that although the net mean increase in the testes weight was only about 100%, the ovarian weight increment in all experiments was significant. Previous work[5] indicated that the bird ovary responded only to much greater dosages of gonadotropic hormone than the testes. Chick ovaries, therefore, are apparently much more responsive than those of other birds since these results with implants confirm similar findings which followed hormone injections.[2]

Preliminary histological study of the testes of birds that received male pituitaries showed stimulation of the seminiferous tubules and only slight increase in interstitial tissue. Testes of those chicks, however, which were given female pituitaries responded with only a slight increase in the tubules but with an hypertrophy

5 Schockaert, J. A., cited by Engle, 1932, *Sex and Internal Secretions*, Baltimore, 778.

of the interstitial tissue. This hypertrophy was characterized by masses of compact, lightly staining cells which resembled, at least superficially, the "luteal cells" of the bird ovary. A more detailed cytological study is now in progress.

These experiments show that chick testes were only moderately stimulated by F.S.H. when such hormone was made available by implantation of pituitaries from castrate rats, and that female pituitaries elicited the greatest physiological response. Several factors may be suggested as influencing these results: (1) possible deleterious effect of the temperature which is about 5°F. higher in the bird; (2) greater weight of the female pituitary gland of the rat; and (3) failure to get an adequate "take" of the gland due either to place of implantation or to the fact that foreign protein was introduced. These variables are being investigated as far as possible.

## 8986 C

## Tolerance of the Rhesus Monkey to Pituitrin Injections and Absence of Uterine Bleeding Following Injection.

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The following experiments were performed to test the possible rôle of pituitrin in the causation of menstrual bleeding. Incidentally the high tolerance of the Rhesus monkey to pituitrin was demonstrated.

By observing the vascular phenomena in intra-ocular transplants of the endometrium Markee[1] has shown that the most constant feature of menstruation is the constriction of the spiral arterioles of the functionalis layer. In view of the further finding of Hartman and Firor[2] that menstrual bleeding could be elicited in monkeys from which the anterior but not the posterior pituitary had been removed, it seemed reasonable to suppose that pituitrin might be responsible for the vasoconstriction that leads to necrosis and sloughing of the functionalis in menstruation.

Preliminarily, a number of female monkeys were injected with large doses of pituitrin to determine tolerance as well as the effect

[1] Markee, J. E., *Anat. Rec.*, 1936, **64**, 32.

[2] Hartman, C. G., and Firor, W. M., *Anat. Rec.*, 1935, **61**, 55.