tinct metamorphic changes in Hyla tadpoles in 7 days. Stronger doses were fatal.)

In contrast to most of the earlier work, where animals were exposed only at intervals, the Ammocoetes were kept in the solutions, which were renewed every 3 days.

In all groups the results were consistently negative. No external evidence of metamorphosis was present, and no effect on size was noted. Histological examination of structures most influenced by metamorphosis, the eyes, the oesophagus, and particularly the endostyle, showed no changes. Experimental animals were indistinguishable from controls in section. Thus, although the metamorphosis of the lamprey endostyle is normally completed in a month, thyroid substance produced no effect on its cellular structure during a 6-week exposure.

From the data collected it may be postulated that although the adult lamprey possesses an active thyroid, the body cells of Ammocoetes, including the cells of the endostyle, are not sensitive to thyroid treatment. Metamorphosis in cyclostomes, therefore, is related to influences other than that of the developing thyroid.

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Action of Mammalian Sex Hormones in the Lizard, *Sceloporus occidentalis.*

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With the discovery of an increasing number of estrogens and androgens in mammals, and an increasingly diverse series of physiological activities in which they are involved, it has become of great interest to examine the action of such substances in lower vertebrates. In adult frogs, injection of estrogens prevents atrophy of the oviduct after ovariotomy,[1] and high doses (1,000 rat units) stimulate growth of the oviduct in normal animals.[2] In normal toads, however, dosages of estrone as high as 10,000 international units have little or no demonstrable action.[3, 4] A surprising result is ovulation in

1 Wolf, O. M., *Anat. Rec.*, 1928, **29**, 41.

2 Wolf, O. M., *Biol. Bull.*, 1939, **77**, 338.

3 Valenzuela, J. R., *Rév. Méd. Cordoba*, 1937, **25**, 179.

4 de Allende, I. C., *Rev. Soc. Arg. Biol.*, 1939, **15**, 185.

Xenopus laevis in response to progesterone, testosterone, and allied compounds, but not to estrogenic substances, such as estrone, estriol, and estradiol.[5, 6] In young alligators estrone stimulates the ovary and oviduct; testosterone also stimulates the oviduct.[7, 8] In lizards testosterone induces secretory activity in "sexual segments" of urinary tubules, and an increase in the size of the oviduct.[9] Estrone, however, produces a marked reduction in testicular size in lizards, but stimulates the epididymis and Wolffian duct.[10, 11]

In this report the results of administration of theelin and testosterone propionate (Oreton)* to adult Fence Lizards *Sceloporus occidentalis,* of both sexes are outlined. Dosages of each hormone used were either .4 cc (.08 mg theelin, 4.0 mg testosterone) given over a period of 5 days, or .5 cc (.10 mg theelin, 5.0 mg testosterone) given over a period of 2 weeks. The difference in effect between the two modes of treatment was only slight, a more pronounced effect being found in each case in the .5 cc group. Twenty-one animals of uniform size and weight were examined. Seven lizards (4♀, 3♂) which were not injected were used as controls. Seven lizards (4♀, 3♂) received testosterone, and 7 (4♀, 3♂) were given theelin. At autopsy the entire urogenital system, the adrenals, and the thyroid were fixed and serially sectioned.

No significant effects of hormone treatment were found in the thyroid, adrenal, ovary, or mesonephros.

Testes were not affected by testosterone, but were slightly reduced in size by theelin. In one exceptional animal reduction in testicular size was so extreme as to throw the tunica albuginea into deep folds.

Epididymides were reduced 20% in diameter by theelin in males. Tubular epithelial cells were reduced to 6μ in height, in contrast to 11μ in control males. Testosterone, on the other hand, slightly stimulated the female epididymis, and markedly enlarged the male epididymis, doubling its diameter. Tubules of such enlarged epididymides were increased 25% in width, and filled with secretion "colloid". The epithelial cells became very high columnar (35μ).

Mitotic figures in the Wolffian duct of the male were increased in

5 Shapiro, H. A., *J. Soc. Chem. Ind.*, 1936, **55**b, 1031.

6 Zwarenstein, H., *Nature*, 1937, **139**, 112.

7 Forbes, T. R., *Anat. Rec.*, 1938, **72**, 87.

8 Forbes, T. R., *Science*, 1938, **87**, 282.

9 Kehl, R., *Compt. rend. Soc. biol.*, 1938, **127**, 142.

10 Turner, C. D., *Biol. Bull.*, 1935, **69**, 143.

11 Clapp, M. L., *Anat. Rec.*, 1937, **70**, suppl. No. 1, 97.

* Theelin was furnished by Parke, Davis & Co. through the courtesy of Dr. Oliver Kamm, and Oreton by Schering Corporation through the courtesy of Dr. Max Gilbert.

number by theelin to 8.5 per cross section, and cell height was raised from high cuboidal (in control males) to high columnar. No effect of theelin was distinguishable in the Wolffian duct of the female. In neither sex did theelin increase the diameter of the duct. Testosterone did enlarge the width of the female Wolffian duct slightly, and mitoses were increased to 17.1 per cross section. Testosterone produced similarly slight enlargement in the Wolffian duct of the male, but mitoses were only 11.0 per cross section.

The most marked effects of theelin and testosterone injection were seen in the oviduct. Theelin produced an increase of 40% in cross-sectional diameter, and of more than 100% in thickness of the wall. This increase was due to a proportional thickening of the mucosa and the mucous glands situated beneath the mucosa. Testosterone elicited an increase of 57% in the diameter of the oviduct, and 115% in the thickness of its wall. However, the increase in thickness of the wall was due almost entirely to enlargement of mucous glands, the mucosa appearing stretched over the increased surface. Evidence of secretory activity in theelin- and testosterone-treated oviducts, but not in controls, appeared in the form of a large amount of methyl green-staining (mucous?) material in the lumen. No increase in mitotic activity was apparent in any of the treated oviducts.

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Effects of Testosterone Propionate on the Female Viviparous Teleost, *Xiphophorus helleri* Heckel.

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Experimental sex-reversal and the study of intersexes in the vertebrates have been of fundamental importance in the analysis of the rôle of the genes and endocrine secretions in embryonic development, particularly in sex-differentiation.

Gallagher, *et al.*,[1] indicated that urine from adult men and women contains both sex hormones and that the ratio of androgen to estrogen is higher in the urine of males than it is in the urine of females. The results obtained by Callow[2] substantiated the work of Gallagher,

1 Gallagher, *et al., J. Clin. Invest.*, 1937, **16**, 695.

2 Callow, *Proc. Royal Society*, 1938, **31**, 841.