androstane-dione at the 0.5 mg. level the scrota are definitely less well maintained, yet the testes are almost normal in size and spermatogenesis is well maintained.

Summary. Various crystalline androgens have been shown to maintain spermatogenesis in the hypophysectomized rat if treatment is begun soon after ablation of the hypophysis. They are not effective in re-initiating spermatogenesis. The capacity of these substances to maintain the testis appears to be unrelated to their male hormone activity.

9414 P

Effect of Oestrone on Hypophyses and Reproductive Organs of Thyroidectomized Rats.

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Kojima,[1] Severinghaus, Smelser and Clark,[2] and Zeckwer[3, 4] have studied the hypophyses of thyroidectomized rats. Their reports agree that the basophiles increase in number and size and that the reaction is similar to that which occurs following gonadectomy. Zeckwer[4] considers that the reaction is sufficiently different to suggest the possibility that the basophiles are of 2 distinct types, *viz.*, those which react to gonadectomy and those which react to thyroidectomy. She further suggests that these 2 basophilic types are concerned in the production, respectively, of the gonadotropic and the thyrotropic hormones. Zeckwer also reports that the acidophiles are markedly decreased. The findings of Severinghaus, *et al.*, are in essential agreement as they find extensive acidophilic degranulation. Cells which their technique would show to be recently degranulated would be classified as chromophobes with the technique used by Zeckwer.

Zeckwer's suggestion that the cells which react to thyroidectomy are a separate type from those which react to gonadectomy suggested the treatment of a series of thyroidectomized rats with

1 Kojima, M., *Quart. J. Exp. Physiol.*, 1917, **11**, 319.

2 Severinghaus, A. E., Smelser, G. K., and Clark, H. M., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 1127.

3 Zeckwer, I. T., Davison, L. W., Keller, T. B., and Livingood, C. S., *Am. J. Med. Sci.*, 1935, **190**, 145.

4 Zeckwer, I. T., *Am. J. Physiol.*, 1936, **116**, 166 (suppl.).

oestrone. This substance will prevent or correct the changes which occur in the basophiles following castration.

Twenty-five adult female and 12 adult male rats were thyroidectomized. Of these 8 females and 4 males were also gonadectomized. At the conclusion of the experimental period the hypophyses, gonads, adrenals, and accessory reproductive organs including the mammary glands were recovered for histological study. The techniques employed by both Severinghaus and Zeckwer were employed in representative instances. The entire thyroid region was sectioned serially and in every instance was found to be free of residual thyroid tissue.

Five T-animals* and 3 T-C-animals† were sacrificed on the 22nd day after thyroidectomy, 5 T- and 3 T-C-animals on the 42nd day, and 2 T-animals on the 122nd day. Five T- and 6 T-C-animals were sacrificed at 42 days, having received 40 R.U. of oestrone daily during the last 20 days. Five T-animals were treated during the entire 42-day period and 3 T-animals were sacrificed at 122 days, having received treatment during the last 30 days.

The hypophyses of the untreated animals showed the changes which have been described by others. It was possible to distinguish, as Zeckwer has indicated, between "thyroidectomy" and "castration" changes in the basophiles. However, the injection of oestrone in every instance completely or almost completely prevented, or in the cases of delayed treatment, corrected both types of changes. A marked decrease in the number of granulated acidophiles was present in all animals and was apparently unaffected by oestrone-treatment.

The effect of oestrone upon the ovaries of the females thyroidectomized for 42 days and injected the last 20 days was the same as in the normal female, *i. e.*, large corpora lutea were present. In the animals injected during the entire 42-day period or during the last 30 days of the 122-day period the ovaries were very small and showed no corpora lutea. The mammary glands of all animals receiving oestrone showed marked development. This is in agreement with the earlier reports (Nelson[5] and Nelson and Tobin[6]) that oestrone alone will induce marked mammary gland growth in the rat and that mammary development may occur in the absence of the thyroid.

In the untreated thyroidectomized males the reproductive organs

* T animals refers to thyroidectomized animals.

† T-C animals refers to thyroidectomized-castrated animals.

[5] Nelson, W. O., *Anat. Rec.*, 1935, **64**, 52 (suppl.).

[6] Nelson, W. O., and Tobin, C. E., *Endocrinology*, 1937, in press.

were normal in weight and miscroscopic appearance. The reproductive organs of the males receiving oestrone showed the same marked damage that occurs in the intact male treated in a similar fashion. The testes were markedly atrophied and the accessories were very small.

The effectiveness of oestrone in preventing and correcting the changes which occur in the hypophysis following thyroidectomy is similar to its action on the changes that follow castration and appears to be evidence against the idea that the basophiles which react to the 2 operations represent 2 different cell types. It seems probable that there is only one type of basophilic cell in the anterior hypophysis. This cell in different phases of its secretory cycle may react to castration in one fashion and to thyroidectomy in a slightly different manner.

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Further Experiments on the Grafted Eye and the Regeneration of the Lens in Amphibians.

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These studies are another part of a series of investigations which have already been reported[1-4] on the grafted vertebrate eye. The present one is based upon results obtained in 262 operated eyes in an adult salamander, *Triturus viridescens*. In 110 cases the eye was excised and reimplanted in its orbit, *i. e.*, replaced in its normal environment. In 90 cases the lens was removed through an incision made in the cornea. In 62 cases the main blood vessels leading to the eye were severed either along with or without the optic nerve. In a majority of animals the eyes and lenses were measured and dissected in the fresh state.

When the eye is reimplanted there is some reduction in its size followed by a degree of recovery. Careful measurements of the fresh eye show that up to 365 days there is no complete recovery.

1 Stone, L. S., and Ussher, N. T., PROC. SOC. EXP. BIOL. AND MED., 1927, **25**, 213.

2 Stone, L. S., *J. Exp. Zool.*, 1930, **55**, 193.

3 Stone, L. S., and Cole, C. H., PROC. SOC. EXP. BIOL. AND MED., 1931, **29**, 176.

4 Stone, L. S., Zaur, I. S., and Farthing, T. E., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 1082.