

were normal in weight and microscopic 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<sup>1-4</sup> 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.

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

<sup>2</sup> Stone, L. S., *J. Exp. Zool.*, 1930, **55**, 193.

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

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

Cases vary from 85% to 98% of attaining their normal size during this time. In the specimens from which the lens was removed there was also a slight decrease in the size of the eye following operation. This, however, proved to be only temporary, for there was complete recovery by the 120th day.

When the eye is reimplanted the lens disintegrates as shown in previous experiments on adult amphibians (op. cit.). The new lens in this type of experiment begins to develop from the dorsal part of the pupillary margin of the iris from 18 to 20 days after operation. At the end of 365 days the size of the regenerated lens varies from 72% to 92% of its original measurements. In size the degree of recovery is approximately the same as that of the bulb as a whole.

In those cases where the lens was eliminated by removing it through an incision in the cornea the new lens originated in the same manner as in the reimplanted eye. This supports recent findings of Sato.<sup>5</sup> However, the first appearance of the regenerating lens was earlier than in the grafted eye, for it was first seen as early as the tenth day. At the end of 200 days the new lens is varied from 75% to 95% of the normal size. From a study of the ratio of lens and eye sizes there is no indication that the regenerated lenses would reach normal size if left for a much longer time.

The cutting of the optic nerve with its accompanying blood vessels leading to the eye does not stop the circulating blood which one can see moving in the iris. Also the circulation in the eye is not eliminated by merely cutting all the blood vessels leading from the walls of the orbit to the eye and leaving the optic nerve intact. In either type of experiment the presence of a small amount, but continuous supply, of circulating blood is sufficient to prevent the disintegration of the lens and retina. All vessels and the optic nerve must be severed in order to produce the same effect as in the case of the grafted adult eye.

In those cases where the optic nerve was severed the regeneration of the nerve was rapid. Three specimens selected for tests for return of vision in the operated eye showed visual function 63, 65 and 70 days respectively, after operation. This is about the time one finds it in the grafted eye of this species. The technique for visual tests was the same as that already described in detail.<sup>2</sup>

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<sup>5</sup> Sato, T., *Arch. f. Entwmech. d. Org.*, 1933, **130**, 20.