

TABLE II.  
Failure to Prevent Muscular Dystrophy in Suckling E-low Rats with Substances Related to  $\alpha$ -tocopherol

Treatment	No. of young	Dystrophic or dead Days 15-25
Young received 3 mg phytol daily from day 15	16	14
Young received 3 mg 2,2,5,7,8, penta methyl 6 hydroxy chromane daily from day 15	20	13
Young received 3 mg gamma lactone (Fernholz) from day 15	16	13
Young received ethyl laurate only	52	45
Mother received 15 mg 2,2,5,7,8 penta methyl 6 hydroxy chromane on day of littering	54	53
Mother received 15 mg vitamin K <sub>1</sub> on day of littering	18	17
Mother received ethyl laurate only	28	26
Mother received 15 mg gamma lactone (Fernholz) from day 15	24	24

*Summary.* The dystrophy that almost invariably appears toward the end of the lactation period in the suckling young of vitamin E-low mothers can be prevented by the administration of 10 mg of alpha-tocopherol to the mother on the day of littering or the feeding of 1 mg daily to the young from day 10 or 3 mg from day 15. The administration of 3 mg of alpha-tocopherol daily from day 18 was ineffective. The following compounds related chemically to alpha-tocopherol were tested for anti-dystrophic activity and found inactive: 2,2,5,7,8-penta-methyl, 6 hydroxy chromane, phytol, gamma lactone and vitamin K<sub>1</sub>.

## 1155 P

### Reimplantation and Transplantation of Eyes in Anuran Larvae and *Fundulus heteroclitus*.\*

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These experiments were undertaken on anurans and fishes to compare the results with those obtained from a series of studies on the grafted eyes of urodeles.<sup>1-5</sup> In one group the functional eye in

\* Aided by grants from the John and Mary R. Markle Foundation and the Fluid Research Fund of Yale University School of Medicine.

<sup>1</sup> Stone, L. S., *J. Exp. Zool.*, 1930, **55**, 193.

<sup>2</sup> Stone, L. S., and Cole, C. H., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **29**, 176.

<sup>3</sup> Stone, L. S., Zaur, I. S., and Farthing, T. E., *PROC. SOC. EXP. BIOL. AND MED.*, 1934, **31**, 1082.

<sup>4</sup> Stone, L. S., Ussher, N. T., and Beers, D. N., *J. Exp. Zool.*, 1937, **77**, 13.

<sup>5</sup> Stone, L. S., and Chace, R. R., *PROC. SOC. EXP. BIOL. AND MED.*, 1937, **36**, 830.

*Fundulus heteroclitus*, 4 to 6 cm in length, was grafted in the orbit (32 reimplants and 20 transplants). For several days, or in some cases for weeks, the operated eye appeared perfectly normal. Circulation in most cases returned in 2 or 3 days and ocular movement was present in 10 days. The lens in some cases was slightly opaque as early as the tenth day. It usually broke down rapidly and in the living eye during the first or second month it appeared as a white gelatinous mass protruding through the pupil.

At the end of a month the pupil and the eye became slightly smaller. The iris began to show pigment changes and during the second month most eyes were slowly resorbed. Throughout the experiment the cornea never became opaque.

The animals were sacrificed 1 to 95 days after operation. Histological sections showed that the central region of the retina degenerated rapidly, beginning on the second day. The rod and cone cells in this area were slightly more resistant than other layers. The ciliary region, so resistant in urodeles (opus cited), was still a complete ring of cells on the third and fourth weeks when the rest of the retina was a mass of débris. In one unusual case (2 reimplanted eyes on the same host) both eyes on the ninety-fifth day appeared much like the normal. The lenses were clear and undegenerated and the retinæ had not undergone extensive degeneration.

Eighty-two eyes were reimplanted in the orbit in *Rana pipiens* larvæ 18 mm in length. Thirty eyes sloughed out in 24 hours after operation. Fifty-two healed in place and circulation returned as early as the second day. Forty-three specimens were sacrificed from one to 96 days after operation for histological studies. Several were preserved one month after metamorphosis. The growth and size of many eyes equalled the normal while some were slightly smaller. Ocular movement was observed as early as the tenth day. The cornea was never opaque and in only 2 instances (specimens killed on the third and fourth days) was the lens cloudy. Histological studies showed that in the region of the optic nerve the retina possessed varying amounts of degenerating cells during the first week. A number of cells were also lost throughout the ganglion cell layer. Some cells were lost locally in the inner nuclear zone while the rod and cone cells seemed to be normal. During the second week the optic nerve degenerated as far as the chiasma. From the second week to one month after metamorphosis there was no further sign of degeneration. If injuries were not extensive at operation the retina healed early but always carried the scar. These eyes showed very little capacity to regenerate even an optic nerve. This is quite different from the results obtained in urodeles (opus cited).

Ten eyes were reimplanted in the orbit in *Rana clamitans* larvæ about 65 mm in length. Three died immediately after operation. Two eyes were severely injured at operation and were slowly resorbed by one month before the hosts metamorphosed. Five cases were sacrificed from 150 to 227 days after operation. Two of these were carried to metamorphosis and 3 were killed from 53 to 80 days after metamorphosis. All eyes and their pupils were slightly smaller than normal at the end of the experiment.

Histological studies showed that no degeneration was taking place in the eye when the hosts were killed. All retinae were slightly thinner than normal. They showed a reduction in the number of ganglion cells and the inner nuclear zone was not as deep as the normal. In every case the small optic nerve stump at the bulb did not penetrate further than the choroid coat. The optic nerve was completely absent from the bulb to the chiasma. The lens was slightly smaller but normal histologically. All other structures appeared normal in both the living state and in histological preparations. The results in these older larvæ seem to be about the same as in those of the much younger *R. pipiens*.

## 11556

### Occurrence of Riboflavin in Tubercl Bacillus.\*

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It has been known for several years that aqueous extracts of the tubercle bacillus exhibit yellow fluorescence in ordinary light. We have attempted the purification and characterization of this yellow pigment. Extracts of partly defatted tubercle bacilli made with 25% alcohol showed a yellow fluorescence in ordinary light and a beautiful blue fluorescence in ultraviolet light. The formation of lumiflavin upon alkaline irradiation indicated the presence of a

\* Aided by grants from the Research Committee of the National Tuberculosis Association and from the Rockefeller Foundation.

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