in the survival times of the members of each pair (Experiment 3, Table 1).

These results do not confirm the findings of Proger and his collaborators in similar experiments.

The experiments will be reported in detail elsewhere.

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Effects of Ultraviolet Radiation on Visual Thresholds

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In a recent paper (*1*) E. Ludvigh and V. E. Kinsey demonstrated that visual threshold light-difference sensitivity and critical flicker frequency tests in the *fovea* are not affected by previous exposure for 5 minutes to the radiation of a 1,000-watt mercury vapor arc, from which most of the visible and almost all of the ultraviolet radiation shorter than 320 mμ were filtered out. These findings seem to contradict the results obtained with baby chicks (*2*, *3*), in which extensive changes in sensitivity thresholds were obtained and which the authors cited can attribute only to the marked difference in absorption and in general physiological characteristics between the eyes of baby chicks and those of adult human beings. They conclude that ultraviolet radiations longer than 320 mμ encountered in nature are without deleterious effect on these functions of the normal human eye.

For the chick (*2*, *3*) as well as for the human eye (*4*) it has been shown that pre-exposure to the radiation of a mercury vapor arc emitting ultraviolet light above 285 mμ in addition to the visible wave range raises the final dark-adapted thresholds considerably above the normal level (1.3 log unit for the chick and 0.25 log unit for the human eye), as compared with pre-exposures to the same source but with all ultraviolet filtered out. The adapting brightness is in both cases the same, and hence it is assumed that the final threshold differences are due to the ultraviolet. In Fig. 1 data are given for one human observer (light exposure, 10 minutes, with a large adapting field; test with a 12.5° square field; central fixation; presentation, 1/25 second) and for a series of baby chicks (pre-exposure, also 10 minutes). The data for the human eye are individual readings; the chicken data are averages. The figure shows the interesting fact that in both cases the cone part of the duplex dark-adaptation curves is unaffected by the pre-exposure to ultraviolet, while the rod segments are clearly altered. For the human curve the onset of rod adaptation is delayed for about two minutes, the cone segment overshooting the normal beginning of rod adaptation and remaining above the previously established level until termination of the test. For the chick the slopes of cone and rod segments are quite different from those for the human, so that, due to the steepness of the cone segment, an overshooting is not apparent. It is also found that a reduction of the extent of the ultraviolet spectrum reduces the effect on final thresholds; light containing only wave lengths above 365 mμ has no effect. Ultraviolet alone, after largely eliminating visible light, acts in qualitatively the same manner as visible light to which ultraviolet has been added.

Previously it has been pointed out (*3*, *4*) that the effect of ultraviolet upon the cones is probably prevented by their

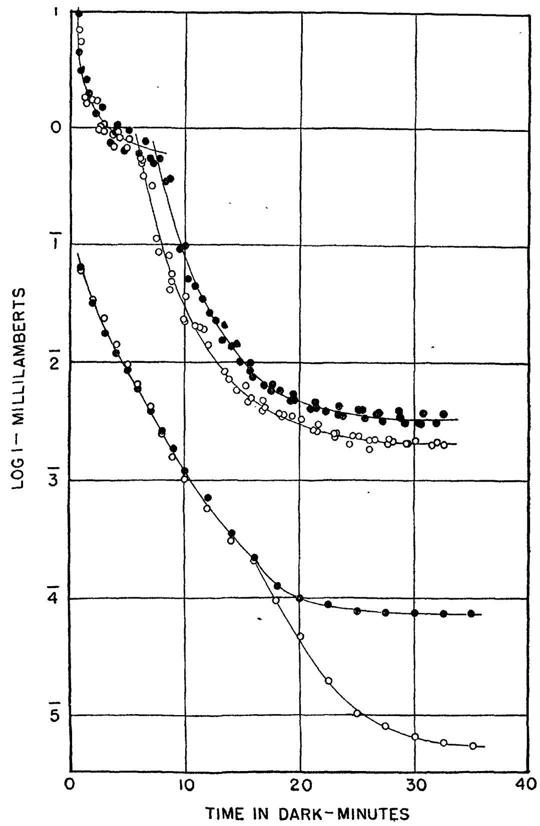

Fig. 1. The course of dark adaptation of human eye (above) and for baby chicks (below) after exposure to the radiation of mercury vapor lamps. Open circles indicate that the ultraviolet has been filtered out; black circles, that ultraviolet above 285 mμ is present.

dense pigmentation, while it acts upon the pigment-free rods. Therefore, while testing *foveal* intensity discrimination, or flicker thresholds, after pre-exposure to ultraviolet, it is obvious that an effect upon visual thresholds cannot be expected, since one is dealing with an irresponsive pure cone population of sensory units with exclusion of the rods. A test of this kind has no relevance to the problem of the presence of an ultraviolet effect upon the peripheral rod units.

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