On the light adaptation of the"blue"mechanism.

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It has been known for some time that the light adaptation of the blue-sensitive mechanism has a different course for short- and long-wavelength fields that produce the same change in sensitivity in the steady state (Stiles, 1949; Augenstein & Pugh, 1977); and this fact adds to other evidence that psychophysical sensitivity to signals originating in the short-wavelength receptors is controlled by signals from the P535 and P565 cones (Pugh & Mollon, 1979). However, the time course of light adaptation for violet targets on yellow fields has a fine structure not previously reported. For 575-nm fields of radiances greater than $10^{10.8}$ quanta.sec^{-1}.deg^{-2} (which place the observer on the 'Π_3 plateau') the threshold for a 436-nm, 200-msec test flash *rises* by > 10dB during the first 10 sec of exposure to the field; only thereafter does sensitivity recover.

Traditional psychophysical methods are unsuitable for following the course of a rapidly-changing sensitivity and we have therefore used a procedure we call *transverse titration* or *The Method of a Thousand Staircases*. The observer makes successive passes (typically 16 in our experiments) through the temporal sequence of stimulation. On the first pass all targets are presented at the same radiance and the observer's response at each time value (Δt) is stored by the computer that controls the experiment. On the second pass (following a break to allow recovery from adaptation) the intensity delivered at any Δt depends on the response made at that Δt on the previous pass but is independent of earlier responses in the current pass. On the third pass, the stimulus level at each Δt depends on the corresponding response on the second pass; and so on. Thus a large number of independent staircases are maintained concurrently, one for each Δt. Thresholds are based on the intensity levels visited on the final 8 passes.

The temporal resolution provided by this method reveals a remarkable secondary feature of the light-adaptation function described above: a large-amplitude oscillation may be superimposed on the function, suggesting that the long-wavelength signal is opposed by a feedback signal that acts with a significant delay.

References: *Augenstein, E.J. & Pugh, E.N. (1977). J. Physiol., 272, 247-281.*

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