

Depth-Discrimination Thresholds as a Function of Binocular Differences of Retinal Illuminance at Scotopic and Photopic Levels*

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The precision of depth discrimination has been measured in a two-rod test apparatus involving real-depth cues. The effects of two variables have been studied: (a) the level of equal retinal illuminance presented to the two eyes; and (b) the difference in the level of the retinal illuminance presented to the two eyes. It has been found that depth discrimination in this test varies as a function of the level of equal retinal illuminance presented to the two eyes in much the same way that acuity or intensity discrimination vary with luminance. Stereoscopic threshold angles vary more than 19:1 over some five log units of variation in illuminance.

Unequal retinal illuminance presented to the two eyes at any given illuminance level has a comparatively small deleterious effect upon the precision of depth discrimination. This effect progressively increases as the inequality of retinal illuminance is increased.

These results have significance for photochemical theories of vision and for the classical theory of binocular space discrimination.