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ENERGY, QUANTA, AND VISION

BY SELIG HECHT, SIMON SHLAER, AND MAURICE HENRI PIRENNE, The Journal of General Physiology.

Abstract

There have been numerous attempts at determining the amount of light quanta needed for vision. Several results have been proposed to yield physiologically relevant predictions, but they have proven to be too inaccurate or the experimental design was lacking consistency. In this paper, we tackled we investigated the energy threshold of retinal rods such that vision can occur. As a light source, we used a ribbon lamp. The light passes through a double monochromater and a shutter until the light eventually reaches the experimental subject that reports whether he has registered a light or not. Then, we applied the necessary corrections for the results due to the fact that some of the light quanta are either reflected, absorbed by the cornea or are not absorbed by the rods at all. We thus conclude that for a human observer to see at least 1 quantum of light is to be absorbed by each of the 5 – 14 retinal rods.