Recent studies of visual comfort and visibility have shown that persons vary considerably. Some are very sensitive to brightness and find that what may be a comfortable situation for others is considerably annoying and uncomfortable to themselves. In Figure 9 is shown the range of brightness judged to be at the

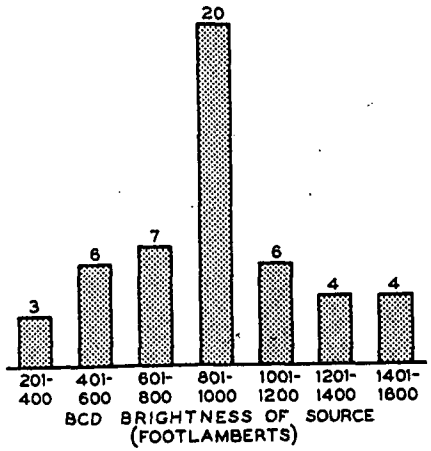


Figure 9. The brightness judged to be at the borderline between comfort and discomfort as selected by each of a group of observers. Some individuals are much more sensitive to brightness than others.

borderline of comfort and discomfort,[34] as selected by each of a group of 50 observers. The number of observers selecting borderlines falling within each range is given at the top of the column. The average brightness selected was 890 footlamberts. However, if this were used as the basis for determining brightness limitations, 50 per cent of the observers would be uncomfortable. In other words, a much lower source brightness must be used if all observers are to be comfortable.

Even though they may have so-called normal vision, some individuals require three or more times as many footcandles as others to obtain the same visibility level.[41] This is illustrated in Figure 10 in which are plotted the footcandles required by various percentages of observers for several visibility levels. Thus 50 per cent of the observers will obtain a visibility level of 5 with 30 footcandles. However, about 90 footcandles are needed if at least 95 per cent of the observers are to be able to have the desired visibility level. These data are for high-contrast printed matter. Nevertheless, they do show that many people require more light

[41] S. K. Guth, Lighting for the forgotten man, *Am. J. Optometry and Arch. Am. Acad. Optometry*, **32**, 413 (1955).

than others. It has been shown that older workers often require much more light than younger workers.[42]

Subnormal vision also will reduce the visibility of an object, and a somewhat higher level of illumination for the desired visibility level will be indicated. Obviously, defective vision should be corrected if at all possible. Nevertheless, many individuals who cannot be given so-called normal vision, can be materially aided by more adequate lighting levels. Thus, their years of productivity can be extended and the employer can continue to take advantage of the considerable training and experience of these workers.

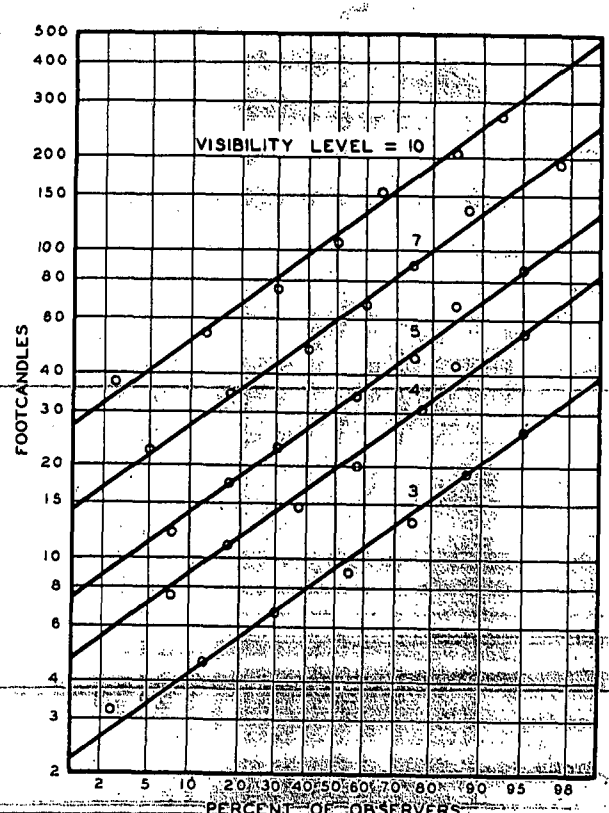


Figure 10. The footcandles necessary for various percentages of observers to obtain given visibility levels.

[42] H. C. Weston, Age and illumination in relation to visual performance, *Trans. Illum. Eng. Soc. (London)*, **14**, 281 (1949).