In 1990, in the interests of greater photometric accuracy, the CIE produced a Modified Photopic Observer, having greater sensitivity than the CIE Standard Photopic Observer at wavelengths below 460 nm. This CIE Modified Photopic Observer is considered to be a supplement to the CIE Standard Photopic Observer not a replacement for it. As a result, the CIE Standard Photopic Observer has continued to be widely used by the lighting industry. This is acceptable because the modified sensitivity at wavelengths below 460 nm has been shown to make little difference to the photometric properties of light sources that emit radiation over a wide range of wavelengths. It is only for light sources that emit significant amounts of radiation below 460 nm that changing from the CIE Standard Photopic Observer to the CIE Modified Photopic Observer makes a significant difference to photometric properties. Some narrow band light sources, such as blue light emitting diodes, fall into this category.

In 1951, the CIE adopted the CIE Standard Scotopic Observer to characterise the spectral sensitivity of the human visual system by night. The Standard Scotopic Observer is used by the lighting industry to quantify the efficiency of a light source at stimulating the rod photoreceptors of the eye (see Section 2.1.4).

The CIE Standard and Modified Photopic Observers and the CIE Standard Scotopic Observer are shown in Figure 1.2, the Standard and Modified Photopic Observers having maximum sensitivities at 555 nm and the Standard Scotopic Observer having a maximum sensitivity at 507 nm. These relative spectral sensitivity curves are formally known as the 1924 CIE Spectral Luminous Efficiency Function for Photopic Vision, the CIE 1988 Modified Two Degree Spectral Luminous Efficiency Function for Photopic Vision, and the 1951 CIE Spectral Luminous Efficiency Function for Scotopic Vision, respectively. More commonly, they are known as the CIE V (λ), CIE V_M (λ), and the CIE V' (λ) curves. These curves are the basis of the conversion from radiometric quantities to the photometric quantities used to characterise light.

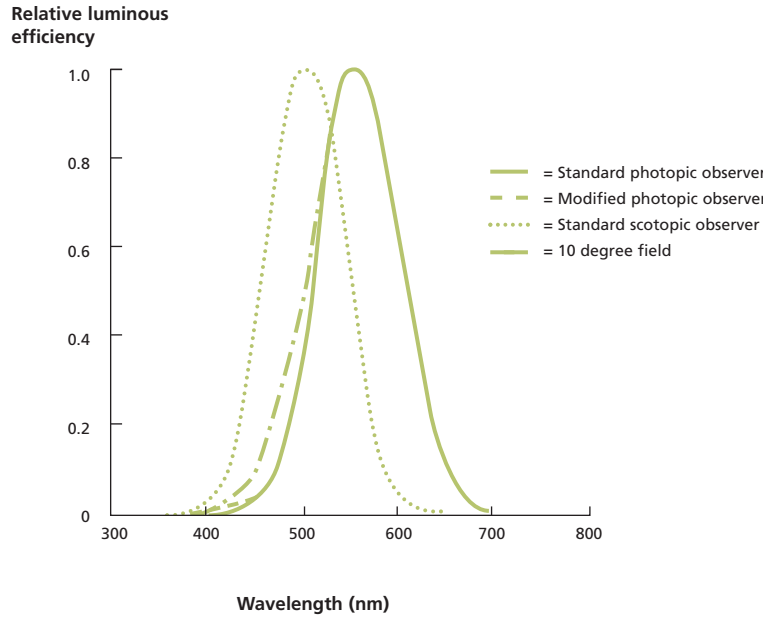

Figure 1.2 The relative luminous efficiency functions for the CIE Standard Photopic Observer, the CIE Modified Photopic Observer, the CIE Standard Scotopic Observer, and the relative luminous efficiency function for a 10 degree field of view in photopic conditions