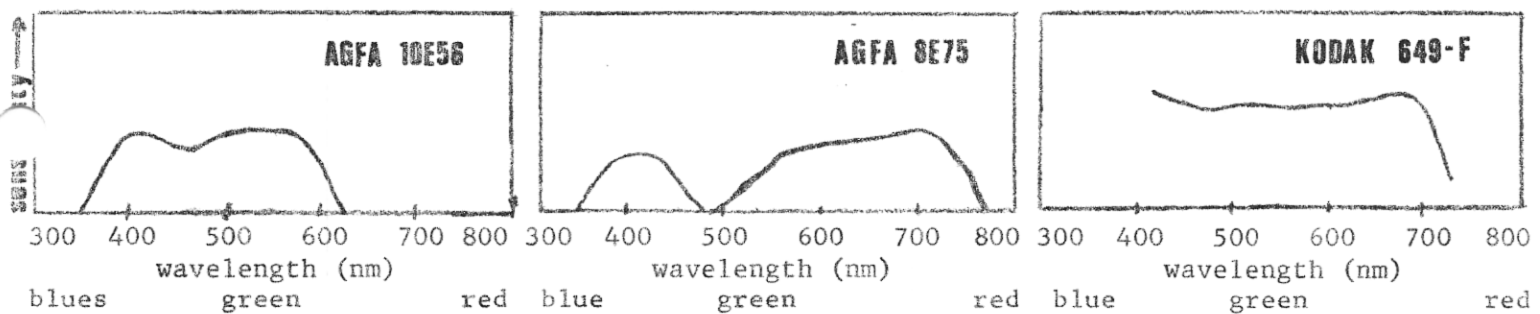


SPECTRAL SENSITIVITY

A problem with silver-based technology since the days of early photography has been that the materials are inherently more sensitive to the higher frequencies of light (the short wavelengths in the blue end of the spectrum) because they carry the most energy. Blues and whites would photograph fine, but the greens and reds would come out relatively darker because the material was not responding to those colors. In the latter part of the nineteenth century, the discovery of introducing dyes into the emulsion which made the halides sensitive to green and red paved the way not only for black and white photographs with the colors in their natural tonal relationships, but also color photography as well as holography by Helium-Neon Laser.

Choosing a material for holography depends on its sensitivity to the color of the laser that is being used. Consulting a spectral sensitivity curve for the material in question will help make this decision as this is a graph of the relative sensitivity of the material to the different wavelengths. The vertical axis represents

SPECTRAL SENSITIVITY CURVES



relative sensitivity, the horizontal axis depicts the colors of the spectrum by wavelength. From looking at the above curves, the 10E56 emulsion is sensitive to blue and green light only, and is not suitable for making holograms with red lasers, but it can be handled under red safelights. 8E75 lacks green sensitivity, so a green safelight is used. This film was designed for holography with Helium-Neon and Ruby lasers. The Kodak Spectroscopic Plate 649-F is panchromatic -- it is sensitive to light of all colors. This material is extremely fine grained and was used in recording the earliest holograms of Leith and Upatnieks. Its slow speed makes its use prohibitive with small Lasers but with its panchromatic sensitivity it can be used for recording full-color holograms.