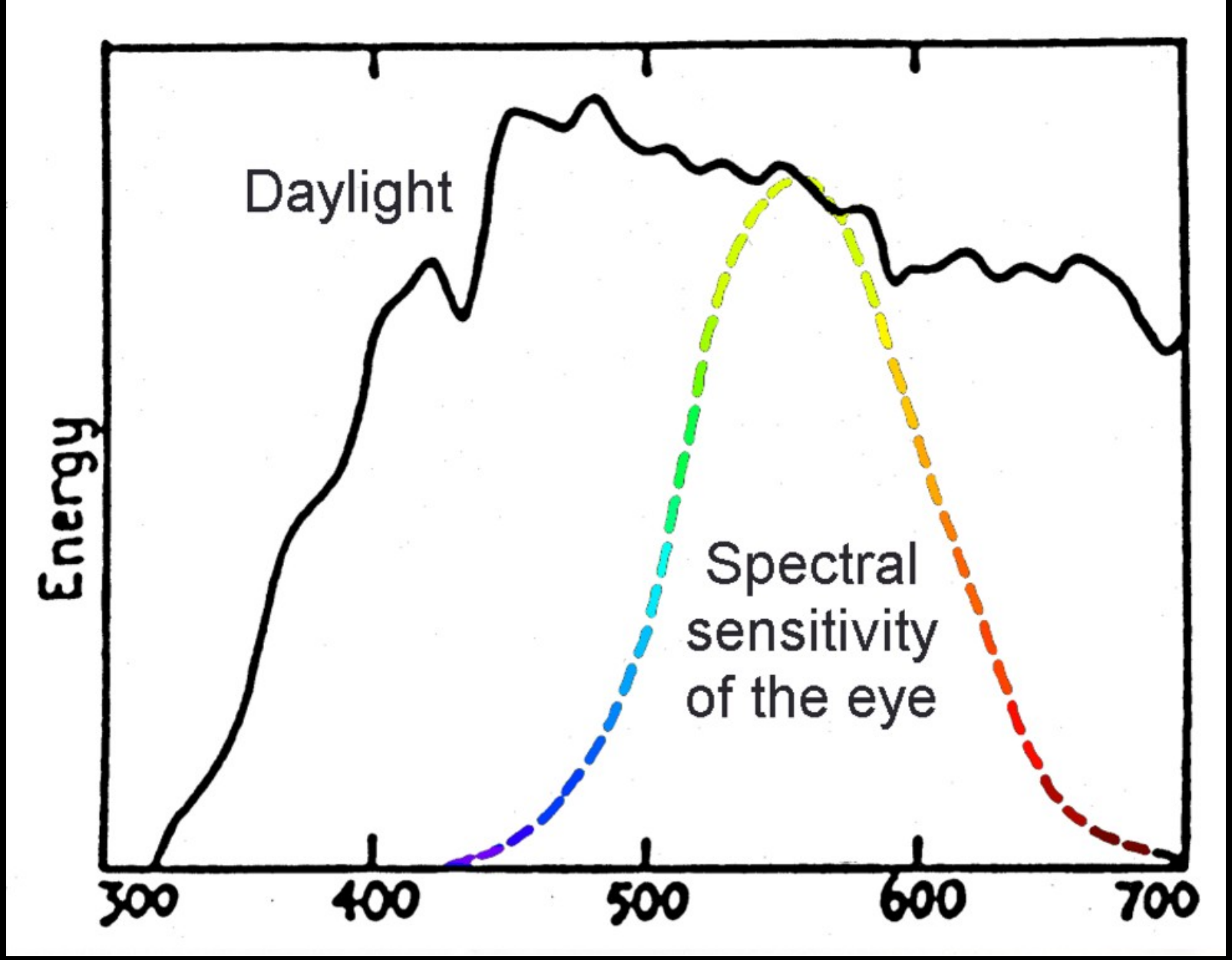
Light and energy

And colour rendering

And photochemistry

And what are lumens per watt?

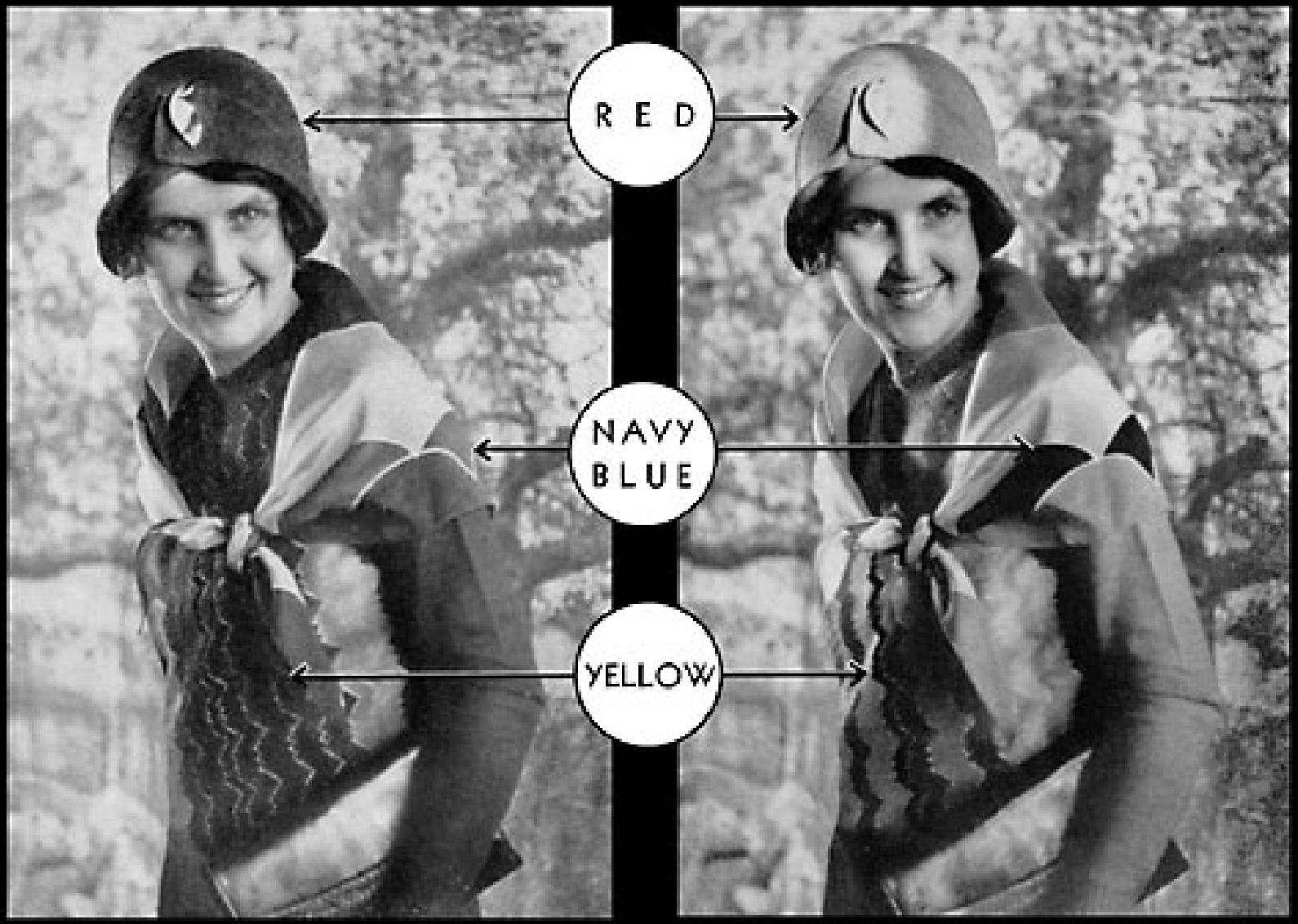


Yellow-green light allows reading black on white
In a dim light.

A dark figure
needs
a lot of light, so
yellow green
illumination is
efficient, but
unpleasant.

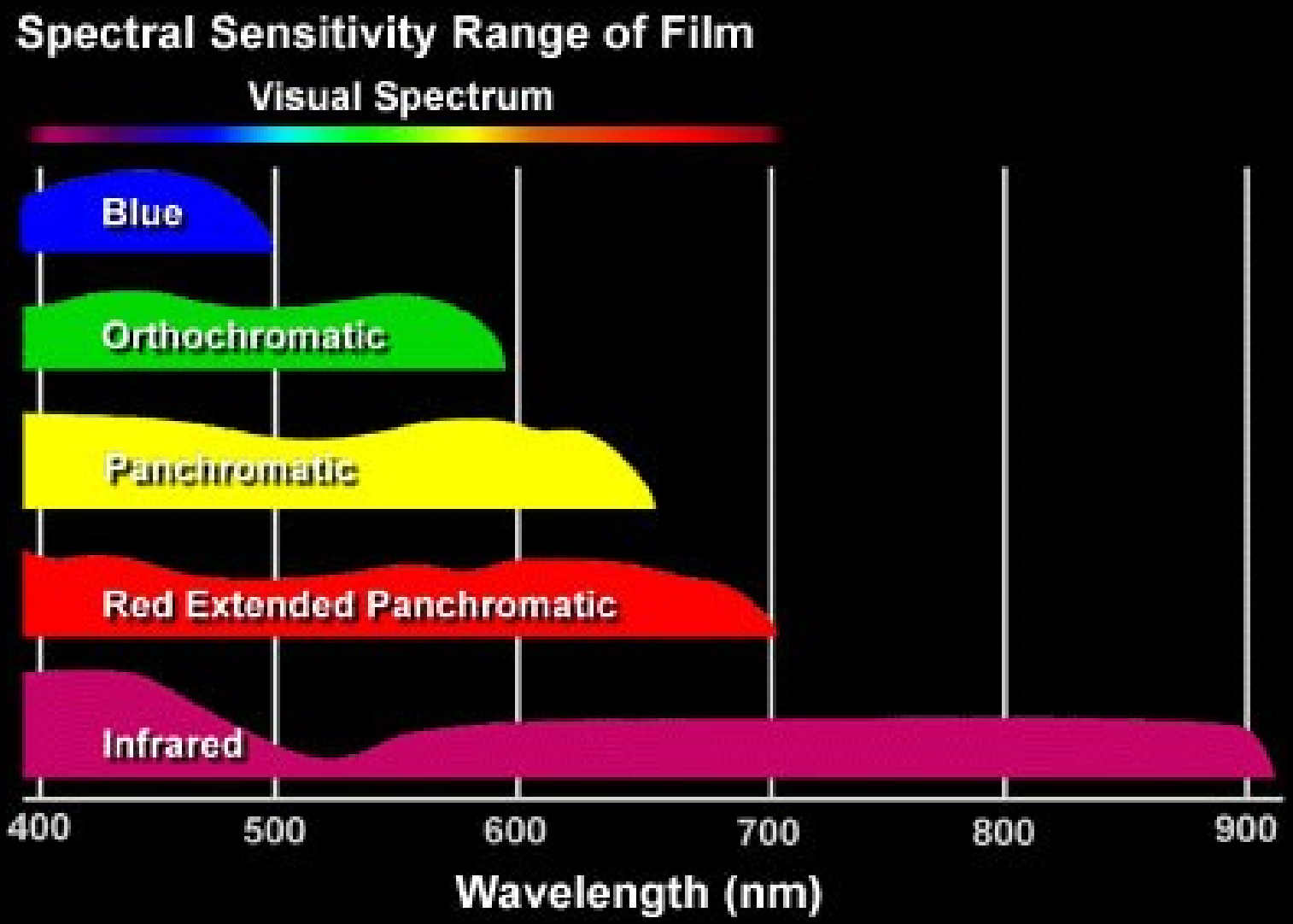
Here is better colour rendering, which hardly helps with these objects.

The loss of efficiency can be compensated by putting objects closer together.

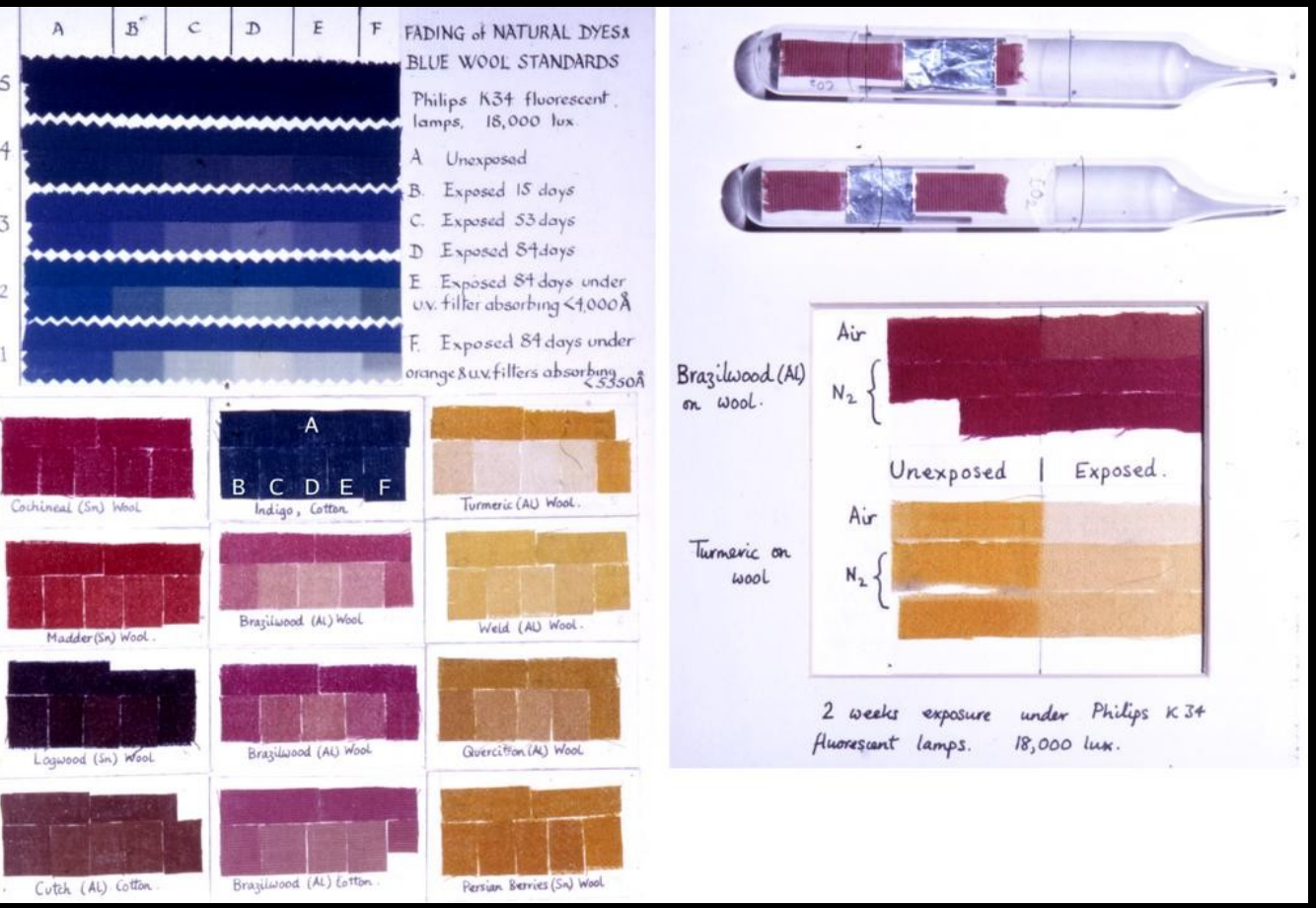


Ortho film – blue sensitive Pan film – entire spectrum

Neither image correctly represents the scene

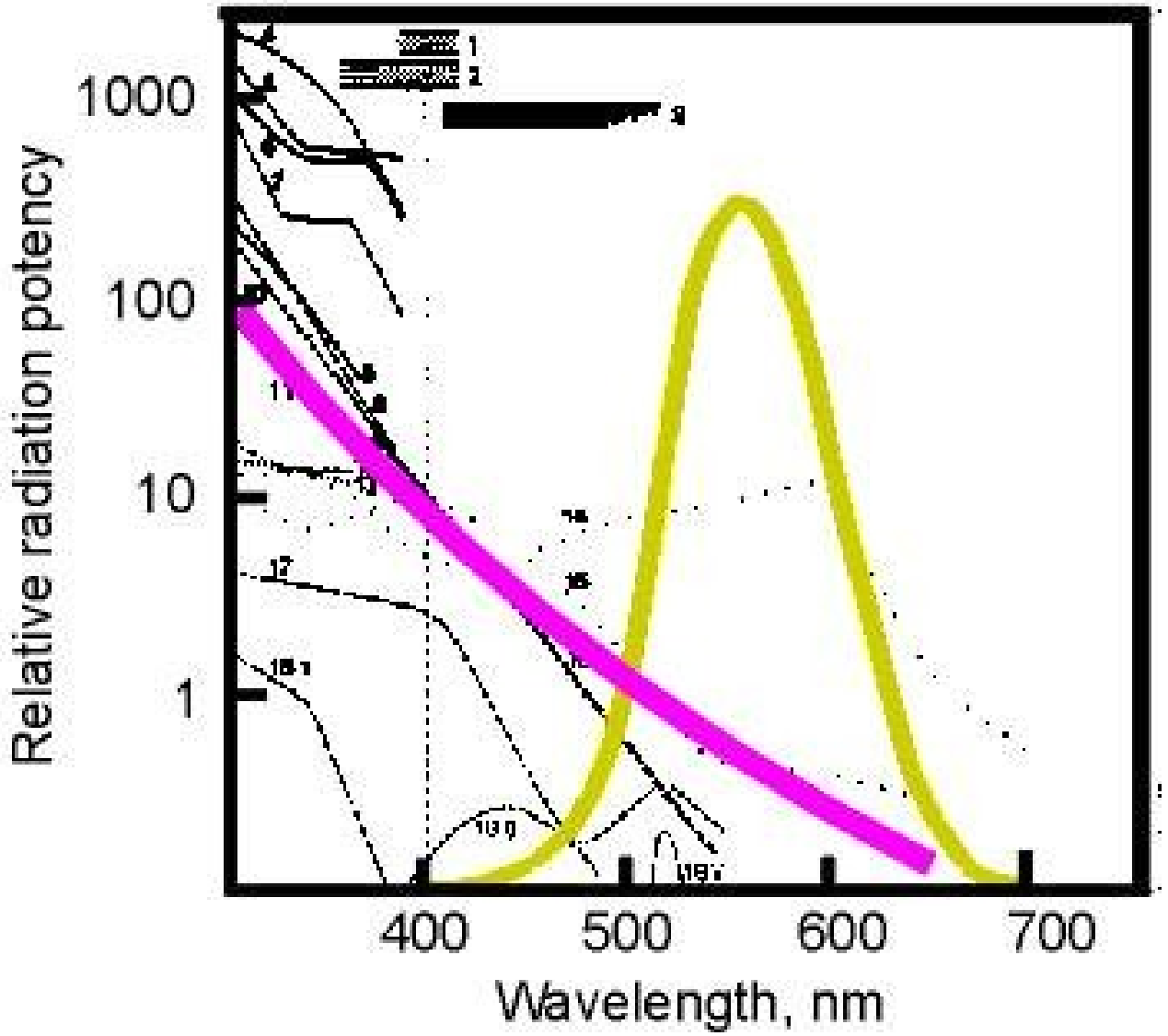


There is no film that correctly renders what the eye sees into monochrome – though a filter is available it is hardly ever used.



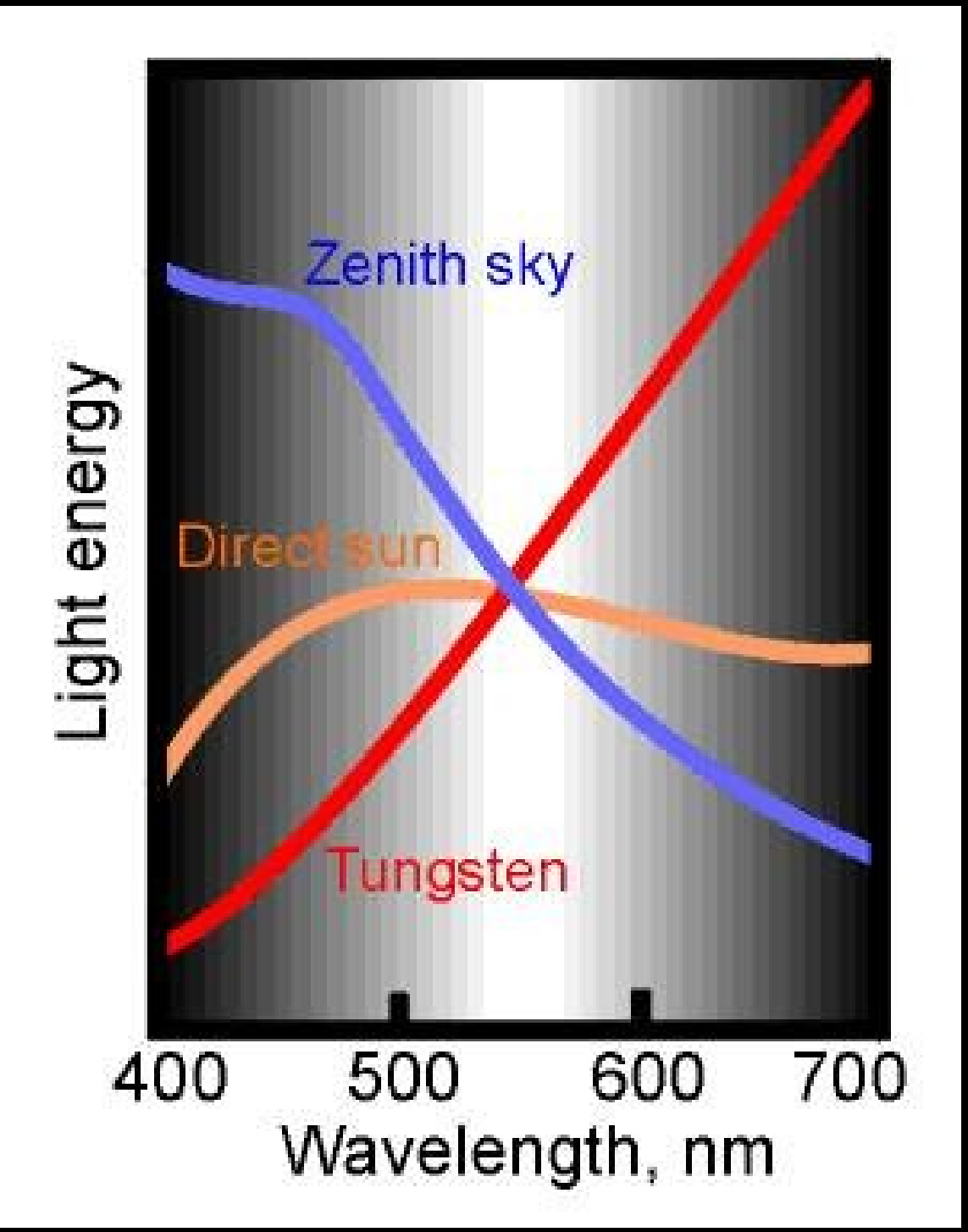
Given that the eye/brain is easily fooled, what does light do to the objects?

The bottom half of each sample has been exposed to light through filters. The patches on the right are protected by both UV blocking and blue absorbing filters. The second right is protected by UV filter alone.



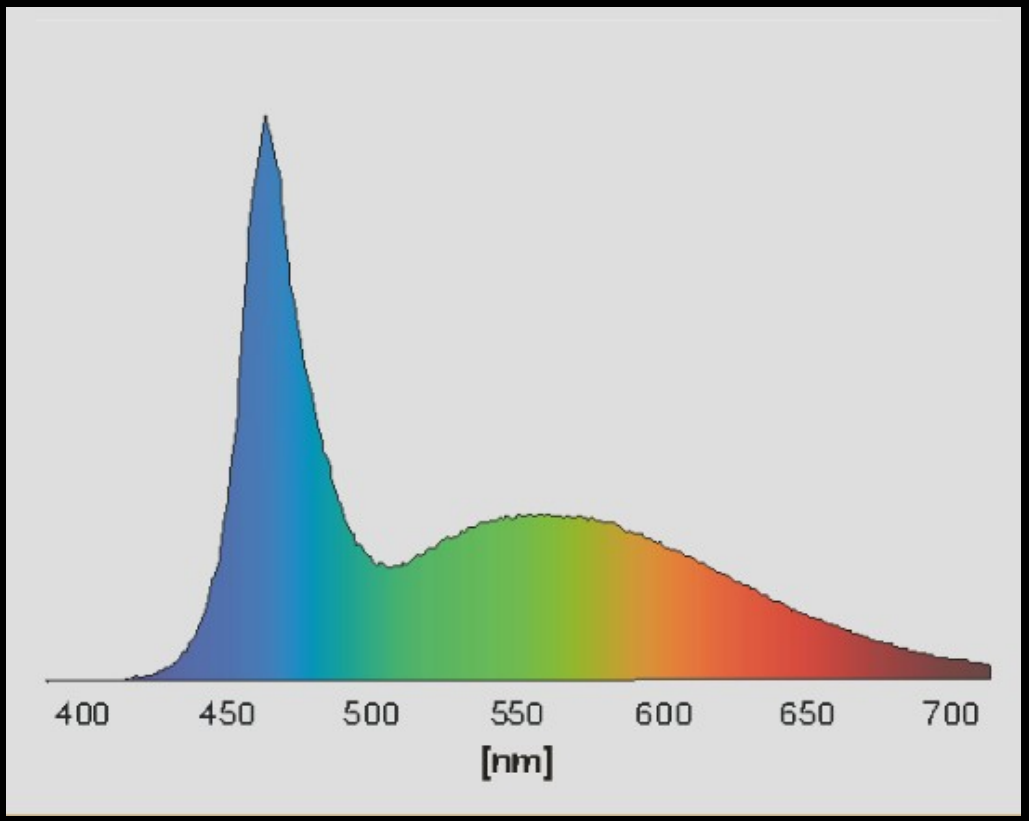
There isn't much overlap between the sensitivities of the eye and of the average museum object.

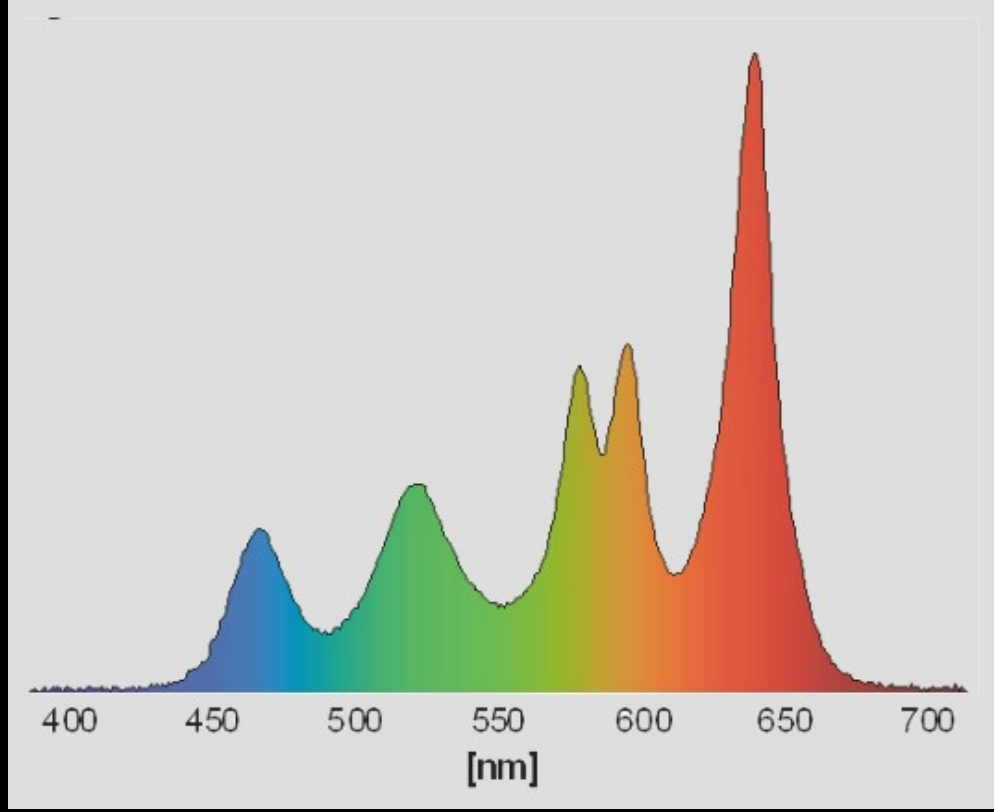
Reducing the blue component in the illumination alters the colour, depending on the colour range (gamut) of the object. (Georgia O'Keefe)
But incandescent lamplight is already deficient in blue, yet has a colour rendering index of 100



Commonly used light sources have different photochemical potency when normalised to the same lux value.

The lux is a measure of effectiveness in stimulating the brain, not the object illuminated.





White LED

RGB LED

There are two LED technologies: phosphor coated blue LED and LED assemblies with different emitter chemistry. But one cannot avoid the compromise between colour rendering and lumens per watt economy.