



Figure 3-18: Spectral distribution of (top graph) absorption and (lower graph) transmission for various filters.

*By the discovered Properties of Light to explain the permanent Colours of natural Bodies.*

These Colours arise from hence, that some natural Bodies reflect some sorts of rays, others other sorts more copiously than the rest. Minium reflects the least refrangible or red-making rays most copiously, and thence appears red. Violets reflect the most refrangible, most copiously, and thence have their Colour, and so of other Bodies. Every Body reflects the rays of its own Colour more copiously than the rest, and from their excess and predominance in the reflected Light has its Colour.

Figure 3-19: Newton's perspective on the colors of objects [reprinted from *Opticks*, pg. 135 (1704)].

Tree leaves are considered reflecting objects whose strong green color is associated with chlorophyll. The chlorophyll absorption spectrum peaks at both 450 nm and 650 nm, meaning that chlorophyll absorbs strongly in the blue and red; therefore, the leaves appear green, as they strongly reflect the green, which is not absorbed. This, of course, assumes daytime white sunlight; if we use, for example, red or blue light, these color components will be absorbed, so the leaves will appear black!

Tree leaves contain other pigments whose action is largely suppressed during the spring and summer. With the gradual drop in fall temperatures, chlorophyll gradually degrades, so the