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Spectral Quality Experiment

by T. A. Elmgren

Here is a report on a certain experiment we did in my office, bearing in mind that the part of the quotation above where Luckiesh and Moss states: "TWO COLORS OR ILLUMIANTS MAY APPEAR OF THE SAME HUE BUT MAY DIFFER MARKEDLY IN SPECTRAL QUALITY."

An optometrist asked me why I prescribed a certain type of glass in preference to another type glass. The price being the same and the appearance of the finished lenses being apparently identical. My answer was "the frequency graphs reveal that one does not transmit as much of the red spectral light as the other, and that in prescribing this sort of glass, my aim is to decrease red transmission and allow the maximum of green-yellow spectral light to be transmitted." Then I was asked, "How can you prove, in a practical manner, understandable by a layman, that the glass you use is superior for this purpose than similar glass, which appears to be of the same hue, to bring about the desired result?"

It was a sensible question which I could not ignore. Hence, I had two lenses ground, identical in dioptric value, thickness and polish, one of each of the glass material discussed, - I do not think it would be ethical to mention the trade names, - then mounted them in a skeleton container. A screen made out of soft wood was placed in focus with the lenses. We took the contraption into the street when the sun was in its zenith and watched the focal points on the wood screen to learn if there would be any difference in the heat transmitted by the two lenses. In the end of ten minutes my favorite lense which will refer to as A, had a scant millimeter imprint in the wood screen. The other one, which I shall refer to as B, had burned a two-millimeter area.

This experiment showed that lense "A" transmitted less of the heat waves that lense "B". Filters or lenses which may appear to look alike, do not transmit spectral light alike.

Then we placed matches on the wood screen to learn if they would "light" "strike" or "ignite" at an identically length of time. Well sir, it took twice as long for the match to ignite under the "A" lense than under the "B" lense. In other words, the match under the "B" lense ignited in half the time it took for the match to light under the "A" lense.

We decided to carry the experiment still further, therefore, we selected two other types of glass, both intended to cut down or eliminate glare and so-called squint, ground the lenses identical in dioptric value, thickness and polish as "A" and "B" and named them "C" and "D". We rigged up all four lenses in a contraption with a soft wooden screen and repeated the experiment.

Immediately upon placing the lenses in focus with the sun and screen, the screen began to burn under the "C" and "D" lenses. Likewise, the matches ignited immediately upon being placed on the screen. It took several minutes before the wood would show any effect from the heat under "B" and twice as long under "A" compared with "B".

Perhaps the experiment mentioned above gives us the answer to why patients sometimes make this statement, "These green lenses feel so cool to my eyes."

I recall a tourist who consulted me last spring, the principal complaint was: my eyes feel sunburnt. There was no need for a change in lense correction, ductions were in balance. A change in the "Spectral Quality" was needed. Hence a lense which lowered the "Red Spectral Transmission" was prescribed, namely, a lense made out of the type glass which lense "A" was ground. We could have used the "B" type glass, but not the "C" or "D" type.

In the tourist case, we lowered the red spectral quality of light. Thereby, the sensory stimulant was lowered, by allowing the maximum of the green-yellow spectral quality to be transmitted we proved a moderator or equilibrator plus a motor stimulator or stimulant.

"The tourist became a touring advocate to "See Your Optometrist First, then America," but sure he's a Syntonist, too.

So----------Long,

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