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"A choice of color" by Pete Reader

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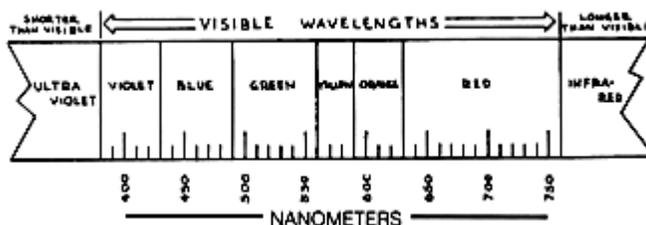
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Choosing the right mix of color in a design is frequently a complex, intuitive process. Although all of us experience color individually and uniquely, most of us react to color on three distinct levels. The first level is aesthetic. Are the combinations of colors visually appealing? Our reaction on this level is governed by individual taste. The second level is emotional. How do the colors make us feel? What mood is created? Our reaction is instinctive. The third level is the psychological. What do the colors symbolize or represent?

When we see a mix of colors, our mind races through these three levels of visual experience to build an impression. For example, what is the proper mood for the final sunrise in Puccini's *Madame Butterfly*? Do we build the dawn with brilliant reds to foreshadow the tragic suicide, or do we subtly suggest tragedy with reddish pinks? In contrast, what about the quality of morning in the opening scene of *Oklahoma!*? What colors do we use in the morning light to reflect the optimism of the ballad "Oh, What A Beautiful Morning"? Is "morning" ambers and lavenders or blues and pinks? Whatever the choice, the look and mood of that first scene sets the look of the entire production.

The quality of morning in either show, while unique to each production, is interpreted through the use of color. The morning light must appear realistic, while also building the emotional and symbolic intensity of the scene. As designers and technicians, we manipulate the combination

and mixture of colors to create the proper context for the dramatic action. To achieve this, we must understand color theory.



Because the eye reacts only to the red, green and blue portion of the visible spectrum, these colors are called the primary hues of light. Their color cannot

be created by the blending together of any other colors, however, their interaction forms the basis for all other color. When all three primaries mix together equally they make white light. This process is called additive mixing. For instance, if we had three lighting instruments focused to a single point, one containing Roscolux (Lux) 27 (Medium Red), one with Lux 80 (Primary Blue) and the last with Lux 91 (Primary Green), the colors would mix to an off-white. (We cannot create a pure white in this process because engineered products, like color filters, cannot be manufactured as perfect primary colors.)

In theory, by the proportional blending of red, green and blue light, we should be able to create any tint of the visible spectrum. Mixing red and blue light generates magenta; red and green make amber; blue and green make cyan. We call these offspring of the primary colors secondaries. (The secondary colors have a complementary relationship with the unmixed primaries in that their combination creates white light.) Magenta and green, cyan and red, blue and amber will mix to white. Any two colors that mix together to make white light are considered complementary. Of course, the purity of the color achieved depends on the ratio and purity of the colors mixed. Red and blue will not make magenta unless the proportions and purity of red and blue are equal and constant. Varying the quantity of either primary will generate a range of tints from Deep Salmon to Indigo. The ability to mix and change colors is one of the greatest challenges to the lighting designer.



Color has three distinct qualities: hue, value, and chroma. A color's hue is its name, like green or violet. We can further define hue by its place in the visible spectrum. Value refers to the relative intensity of the hue such as light blue compared to dark blue or the light to dark relationship of a mixed color. Lighter values are often called tints; darker values are shades. Chroma reflects the saturation of hue. Lux 27 (Medium Red) is more saturated than Lux 26 (Light Red). We use these qualities to compare and choose colors.

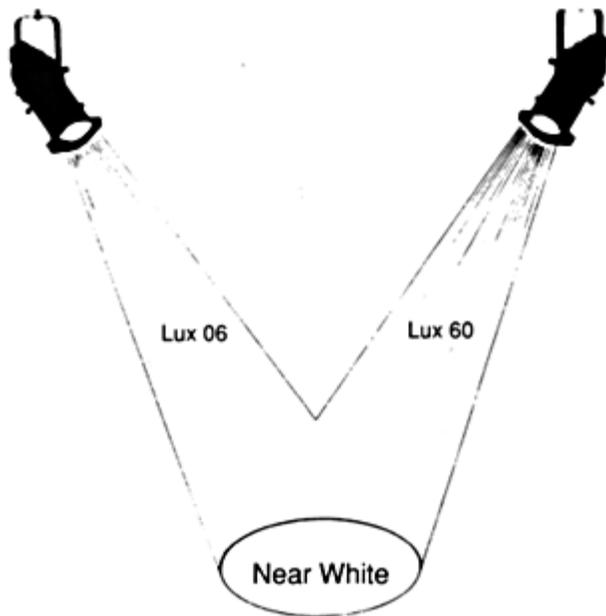
Although the color receptors in the eye, the cones, are sensitive to the primaries, the eye and brain only comprehend color through constant comparison and contrast. We experience color through its relationship to other colors. Color theory describes the interaction and relationship between colors.

The eye craves contrast. To create significant interest onstage, we need contrast for the eye to make comparisons. The simplest color contrast is warm to cool. Looking at red and blue as extremes of the warm/cool contrast, we can assign colors a temperature value given the amount of red or blue in the color. The contrast reflects that same relationship found in nature between sunlight and daylight. Amber (Lux 02 Bastard Amber) can represent the warmth of the sun and light blue (Lux 60 No Color Blue), the reflected cool of daylight. A color's temperature depends on the color to which it is compared. Lux 51 (Surprise Pink) appears cool in contrast to Lux 08 (Pale Gold); but Lux 51 appears warm in contrast to Lux 62 (Booster Blue). The warm/cool relationship, however, is not constant and can change by the addition of another color. For instance, when we place Lux 62 alongside Lux 51 and Lux 08, the Pale Gold

now appears warmer than before, as does the Surprise Pink in relation to the Booster Blue.

Another form of contrast is saturation or chroma. We use the tints of the same hue in varying degrees of saturation to effect subtle modeling of form. For example, with lights positioned from three different angles, we use Lux 61 (Mist Blue), Lux 63 (Pale Blue) and Lux 65 (Daylight Blue) - three gradations in chroma. A similar gradation can be done in a warm range to contrast the cool blue in an area system, by using Lux 06 (No Color Straw), Lux 08 (Pale Gold) and Lux 09 (Pale Amber Gold). This contrast is often used in the round or in thrust staging to effect modeling where visibility is crucial. More saturated colors can be used in the same way to create a feeling of depth upstage. Lux 55 (Lilac), Lux 57 (Lavender) and Lux 56 (Gypsy Lavender) can be layered from downstage to upstage to suggest greater depth.

COMPLEMENTARY COLORS AND CONTRAST



Complementary colors form the most dynamic contrasts. The theory behind this blending of color, which dates back to Stanley McCandless and his "A Method of Lighting the Stage", is that the colors create a contrast in hues and temperature while mixing towards white light. McCandless advocated that the complementary colors should reinforce the motivational sources of stage light as well as provide good visibility. For example, an amber tint (Lux 06 No Color Straw) and a blue tint (Lux 60 No Color Blue) focused at a 45° angle to the stage will mix toward white while establishing the contrast of warm and cool. The amber reinforces the warmth of sunlight and the blue reinforces the recessive cool of daylight. Other colors can be substituted to form the same complementary relationship, like Lux 35 (Light Pink) and Lux 66 (Cool Blue) or Lux 07 (Pale Yellow) and Lux 54 (Special Lavender).

Simultaneous contrast of color will make some complementary color combinations difficult to control. Under the simultaneous contrast theory, a color will shift in appearance towards its complement. Red light will always make us see greenish-blue in the shadows. This does not mean that we should not use red. It does mean that we can use blue to soften the effect of the green shift. Lux 64 (Light Steel Blue) is very good at this kind of blending.

While colored light adds visual contrast and interest, it must also sustain the visual motivation for the scene, otherwise it causes confusion. An actor's face colored by a bright blue or purple light must make sense to the audience within the context of the performance.

Simultaneous contrast makes ambers and pinks the most difficult colors to control because, when you least expect it, the amber will shift towards a yellow or green and the pink shifts towards a muddy red. One solution to the amber and pink problem is to pick colors that are related in hue and value. For example: Lux 05, Lux 37, Lux 52 and Lux 64 form a workable color combination. Lux 05 (Rose Tint) shares more red than green, Lux 37 (Pale Rose Pink) has

red and some blue in its composition, Lux 52 (Light Lavender) balances the red and blue and Lux 64 (Light Steel Blue) has a little red. They all share red which makes the blend appealingly warm without discordant contrast. Replace the Lux 05 with Lux 07 (Pale Yellow) and the Pale Rose Pink will appear redder while the Pale Yellow will look greener. A color that shares qualities of the other colors with which it mixes will be less likely to shift towards its complement. The other trap, however, is to use too many of the same colors which would result in the loss of contrast and visual interest.

COLOR HARMONY IN STAGE LIGHTING

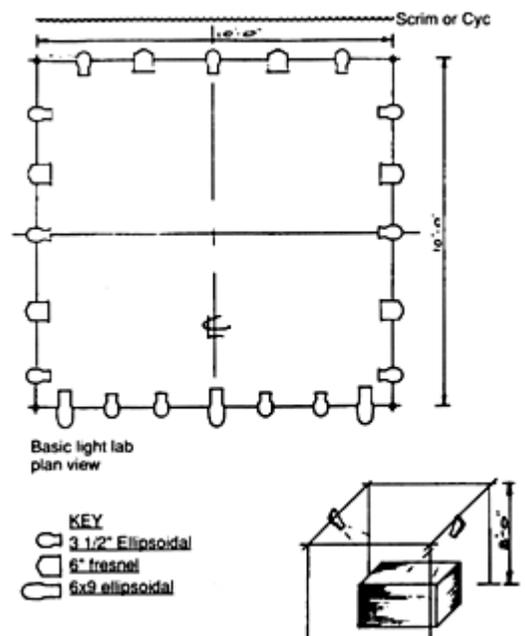
The idea of color harmony is the creation of a visual balance that pleases the eye by its appearance. As lighting designers, we do not just pick color for its aesthetic appeal. We work with color to integrate it into a design that complements the production and its style. How do we decide what colors are pleasing and yet suit the production? The place to begin is in the script where we find the production's emotional tone which we then translate into color. From one, two or three colors, we build a visual concept of the script. From *Music Man* we may get the idea that optimism is pink or from *Sweeney Todd*, revenge is green. From that initial association of idea to color, we begin to build our palette into an emotional chord. A color chord is a group of colors that interact with each other on a visual, emotional and symbolic level. The motivational light is the key color of the chord to which other colors are added. Oftentimes this motivation is sunlight, moonlight or interior light. The degree of perceptual contrast between the colors in the chord creates the visual tension and interest.

The more contrast between colors in the chord, the more discordant their combination will appear, but the colors should not distract from the action onstage. For *Music Man*, a harmonious color chord could be Lux 33 (No Color Pink), Lux 51 (Surprise Pink), Lux 54 (Special Lavender) and Lux 65 (Daylight Blue). All four colors stay within the red-blue range and appear warm, bright and happy. In contrast the chord for *Sweeney Todd* may appear more discordant given the nature of the characters and their actions. Lux 07 (Pale Yellow), Lux 50 (Mauve), Lux 61 (Mist Blue), and Lux 72 (Azure Blue) will set a chord that is both cool and discordant. The Azure Blue and the Mauve will pull at each other in simultaneous contrast to create the most tension.

Despite the best of artistic intentions, color does not always behave the way we expect. Most problems with color are in their mixing rather than the selection. A basic solution to a color problem is to just change the color. If one color appears discordant with the other color choices, then change it for one that more readily blends with the others.

One good way to preview color combinations and minimize surprises is to use a light lab. Small fresnels can be set up in the approximation of the design positions. With the set model and costume swatches, we can test our colors and foresee any problems. But, light lab is not the theatre and problems may still arise.

A typical problem with color mixing occurs when a color is taken down on dimmer. The amber shift of



the lamp compounds the loss of intensity and the stage turns murky. The more saturated the color, the more intensity it needs to read. We need either to choose a color that can be faded or a similar color that is less saturated. If a hue reads too light, then change it to a more saturated color without altering the lamp's intensity. We have to be careful about the intensity and saturation of a color. Without the proper balance, one color may overwhelm the others or just totally wash them out.

BUILDING WITH COLOR

Another problem that arises is the poor blending of color. There is nothing more disconcerting than to watch an actor ripple through layers of unblended color, his facial color changing with each step. Poor blending happens when two or more sources of color do not intersect to mix properly.

For color mixing to take place, we need space. A low grid height or a short throw limits the amount of space in which color can interact. Either we ought to increase the throw of the instruments or limit the palette of colors. The other side of this problem is too much distance. The more saturated the color, the more difficult it is to read over distance. For instance, Lux 85 (Deep Blue) either needs a lot of intensity, which will reduce the effective life of the filter, or a short throw in order to read its color.

Besides the throw, we also have to consider the angle and position of our instruments. Backlight and downlight do not blend well, except on the floor. These two positions often use heavier colors to highlight the set and actors, or to build mood subtly. Sidelight works well in modeling and for promoting contrasts of color. Frontlight is crucial in the mixture of color to create adequate visibility and good facial tone on the actors. Most often, the downstage area must provide visual clarity to the actors, while the light upstage establishes mood. A scene full of moonlight or a subtle transition to sunset is counter productive if the color and/or visibility distracts from the action of the play.

Although all color choices are important, not all colors are important to every scene. We must have a way to control our color blending. One method of control is to have a system of cross lighting that uses pale tints as a no-color wash. "Cross Whites", as some people call them, cross the stage either from the front or the downstage sides of the stage. Designers use this system to build visual intensity and clarity downstage, which saves the designer from having to change color. Cross Whites will clean up murky color on an actor's face, but it will also wash out all other colors. The choice of tints depends on the composition of the overall palette. This system is used to light the front and downstage areas, while more saturated colors light the back and sides of the stage.

USING NEUTRAL COLORS

Another method of color control is to have a system of neutral colors. This system can either be a general wash or area system that covers the acting area. The neutral color is only neutral in its relationship to the other colors of the design. A good neutral color has the ability to appear either warm or cool depending on the other colors with which it is seen. Lux 53 (Pale Lavender), Lux 06 (No Color Straw) and Lux 60 (No Color Blue) are good, stable colors that can appear neutral to more saturated colors.

Around a neutral color system, a designer can build the color palette of the show. This approach is much like the method by which a watercolorist begins a painting. A designer puts down a base wash that acts as a reference point or tone to which he/she adds color and accents. The neutral color acts as a white reference to the other chosen colors and does not need to be white, but only appear white in contrast. To the neutral base, the designer adds stronger, more saturated colors to highlight the scenery, emphasize the colors in the costumes or to create that essential mood. As with the Cross White system, the neutral color can wash out the other colors from the stage. The designer must establish a balance between intensity/visibility and color/mood.

The approaches to color and color mixing are as varied as the designers themselves. Visibility onstage is no longer enough. Color choice must strive for a clarity of vision on three levels: the aesthetic, the emotional and the intellectual. We choose color for a design from our understanding of the script, the director's insight, the production style and the color palettes of the other designers. With an understanding of color theory and interaction, we are able to provide both visibility and insight to the stage action while supporting the efforts of the other designers. Our use of color describes the stage in contrasts, harmonies and tones creating a dynamic stage picture and, hopefully, enhancing the audience's experience of it.

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