Effects of Colored Light on Movement:
How Red, Yellow, Green, and Blue Colored Lights Affect
Movement as Perceived by an Audience

A Thesis
Presented in Partial Fulfillment of the Requirements for
the degree of Master of Fine Arts in the
Graduate School of The Ohio State University

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1996

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ABSTRACT

This thesis examines the subjective nature of working with color in lighting design for dance. After questioning the reasoning behind attempting to succinctly categorize the meanings of colors, I focus this research on my personal use of color in my lighting design for dance.

This thesis reveals, through the process of self-evaluation, ways in which my preconceived notions of color, as well as any attempts I have made to categorize the meanings of color, have hindered my creative process. By initiating subjective exploration, this thesis opens a new approach for me to apply toward my work.

The subjective exploration within this thesis deals specifically with the effects of red, green, yellow, and blue light projected upon a single dance. The results of this exploration enhance future color choices in my lighting design by expanding the potential uses of colored light, rather than limiting them to succinct categories. This exploration is an example of the type of tool upon which to base further study. The results of this exploration are a subjective example upon which to continue further research.
ACKNOWLEDGEMENTS

I would like to express sincere appreciation for the guidance provided by the chair of my committee, Karen Woods. I cannot convey into words the value of her presence, input, and support throughout this process. To my adviser David Covey, I give thanks for a magnificent viewpoint which I admire, respect, and appreciate. His viewpoint has been one which has guided me through the years. I would like to thank Kathy Carbone for her untiring assistance, input, and performance in this project. Sincere appreciation goes out to Carrie Cox for providing a reason when I needed one most. But mostly, I would like to thank my wife Deb Richter for "putting up with me" during this sometimes difficult ordeal.
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CHAPTER 1

INTRODUCTION

Due to the lack of comprehensive written materials pertaining to lighting design for dance, the goal of my research has been to contribute a body of contemporary work to the field of dance lighting. This thesis begins my focus on one aspect of dance lighting: the use of colored light and how it affects a dance.

In the field of lighting design, the number of published books dealing with dance in a comprehensive fashion is minimal. In 1971, National Press Books published *Dance Production Handbook or Later is Too Late* by Lois Ellfeldt and Edwin Carnes of the University of Southern California. The editors' intent was to create a manual for dancers and choreographers. Ellfeldt and Carnes devote only one chapter toward lighting design, giving brief general descriptions about all of the following lighting elements: mood, emphasis, variation, color, special effects and light plots. It would be extremely difficult for a dancer or choreographer to light a concert, or even communicate with a lighting designer, using only the very general information provided in this text.

*Dance: The Art of Production*, edited by Joan Schlaich and Betty DuPont, is another example of the lack of dance lighting literature. In the preface the editors state, “this book is designed as a practical guide for the director or choreographer of a dance production.” The disturbing aspect of this book is that the authors feel a practical guide toward lighting design for dance
can be achieved in one chapter. The author contributing material to the chapter on lighting design is Doris Siegel, a member of the faculty of the Dance Department at the University of Southern California. Although Siegel provides several photographic examples of lighting effects, a sample light plot with related paperwork, and a checklist of things a lighting designer needs to be aware of (most of which pertains to working with the people in the theatre), she gives little practical guidance to the director or choreographer. As a "practical guide", only an exceptional director or choreographer could read this chapter and walk into a theatre situation and light a dance.

The most recent publication, *Dance Composition and Production* (second edition) by Elizabeth R. Hayes, deals with dance composition as well as production. Once again, only a single chapter is devoted to lighting. Although it discusses lighting instruments, illuminating the dance movement, use of colored light, and collaboration between choreographer and lighting designer, the topics are described briefly, yet incompletely. This text is inadequate as a comprehensive guide to lighting design.

Besides these dance specific texts, other theatre lighting books and periodicals were examined. Most of these texts devote a section to dance lighting. Most of these sections are less substantial or helpful than the work of the aforementioned Elfeldt, Schlaich & Du Pont, or Hayes. In fact, most of the theatre lighting texts cross-reference the works of Hayes, Elfeldt, Schlaich & Du Pont. Though each source gives a general idea of lighting for dance, few give any practical or in-depth advice. It appears that the examined texts focus on giving a designer some basic knowledge of 'tools-of-the-trade' and then toss the designer out into the real world to figure things out for him or herself.
Periodicals occasionally print helpful articles on dance lighting. Tom Skelton published, over a two year period, the "Handbook of Dance Stagecraft." Printed in Dance Magazine, this provided a series of "how-to" articles in monthly installments. In these articles, Skelton explained both the choices and reasonings behind his lighting design. He encouraged further research and experimentation as an aid to develop individual styles. Skelton's articles are practical, insightful, and helpful guides in dance lighting. The problem I find with this series is that it is not current. Although most of the principles discussed in the Skelton series may still be applicable, the material refers to equipment which is now obsolete or seriously dated.

Occasionally, TCI, (formerly known as Theatre Craft) and its sister publication, Lighting Dimensions, print articles pertaining to dance lighting, but none of them come close to the comprehensiveness or practical application of Mr. Skelton's body of work. I found the information contained in these publications to be disappointing in their ambiguity. Articles dealing specifically with dance lighting are sporadic; few deal with anything more significant than the biography of a dance lighting designer.

My research led me to other fields of study where color research is prominent. These areas of study led to some interesting findings. In the field of psychology, studies have been done to show the effects colors have on people. According to Faber Birren, a noted researcher of color, psychological research of 1942 determined "red is the color of choice of the manic and hypomanic patient giving the tumult of his emotions their 'burning' and 'bloody' expression"; "yellow is the color of schizophrenia... This yellow is the proper and intrinsic color of the morbid mind." Later, Birren determined yellow to be a sign of feeble-mindedness, while blue was the choice of schizophrenics.
According to Birren, green was the favorite color of psychoneurotic and psychotic individuals.

Birren's desire to examine all aspects of color choices led to his interest in the color palettes of artists, an alternative to the clinical theories of psychology. For example, Kandinsky, having an affinity to the color yellow, wrote:

Yellow is the typically earthy color. It can never have profound meaning. An intermixture of blue makes it a sickly color. It may be paralleled in human nature with madness, not with melancholy or hypochondriacal mania, but rather with violent, raving lunacy.

This cross-referencing of responses, from seemingly unrelated fields, has enhanced Birren's reputation in color theory research. Birren's studies in color theory, originally intended for architectural lighting applications, have affected the color choices made in various fields.

Another field, in which color theory is an important component is advertising. In advertising, finding the "right color" to sell a product is vital. My readings in advertisement led me to Dale Russell, the creator of a series of tests entitled The Designer's Ultimate Guide to Working With Color. Each volume, devoted to a specific color, lists examples and suggestions pertaining to the marketability of colors. According to Russell, red is known as a high profile, eye-catching color that creates an aura of activity. Blue has a masculine association, as well as being considered a color for signifying safety. It is often associated with travel and transportation. Yellow makes objects appear larger. Each color, according to Russell, has a specific meaning or association; using the "right one," therefore, can help when selling a product.

In all, the majority of the fields I have investigated, seem to be attempting to find succinct answers for their 'color questions.' In psychological
testing, the individual is placed in a room and exposed to colored light, for extended periods of time; the subject's response to this light is assumed to signify a behavioral change. Mentally disabled individuals are asked to pick their favorite colors in hopes of allowing psychologists to determine any patterns or trends relating to their disability. The advertising industry does similar research with "normal" people. Products are packaged only after extensive research is done to find the color which sells the best.

Several artists have been known to subjectively study specific colors over extensive periods of time. However, after considerable time and effort spent researching a particular color, some of these artists seem to have taken on the authoritative tones common to the more objective scientific fields, and have made some broad generalizations (see Kandinsky quote above). Even though their studies were subjective in nature, I feel, they have essentially categorized the various meanings of a particular color for themselves.

I question these established theories in the various disciplines which have placed peoples' reactions to color into specific, neat little categories. These color associations create preconceived notions which I feel may not be applicable to the art of lighting design. Will a dancer, performing a calm, smooth swimming action under a saturated red light, be considered "angry," "bloody," or "sexually passionate," as is suggested by the common color associations? If a dancer is violently thrashing under a blue colored light, will the audience still find blue to be a color associated with "calmness" or "safety"? Would the audience consider the blue light to be the cause of the rage in the dancer? Will a green light always make a healthy dancer appear "ill" or "envious"? These are questions which have led me to believe my own exploration is necessary.
My original intention was to conduct an experiment in which a dance piece would be performed under various colors of light in front of an audience which I would survey. I would compile the data from the survey, creating a resource for my future lighting design. Half way into the process, I came to the realization that what I was attempting was no different than the work of the psychologists, advertisers, and artists I had been studying. According to Faber Birren in *Color and Human Response*, "A common and truly unforgivable error in most color research is that many of those who conduct it may fail to realize that color effects are always temporary". Keeping this in mind, I realized the futility of conducting a survey. I changed my approach toward this thesis by focusing on my own knowledge of color. A self-evaluation of my work, followed by ways of broadening my color ideas became the thrust of my work.

In the first chapter I evaluate my overall approach to lighting design. I attempt to find both positive and negative aspects of the way I work. My self-evaluation exposes some counter-productive methods and a degree of complacency, which have crept into my work. Although my self-evaluation reveals potential changes in all the aspects of lighting design (angle, intensity, movement, etc...), the focus of this thesis is on my use of color.

In the second chapter, I evaluate several works, lit during my graduate school year. The works chosen involved a heavy color component. This chapter evaluates these works closely, and I challenge the color choices I had made earlier. Subsequently, I have discovered that my approach in the past leaned away from the ever changing subjectivity of color noted by Birren. I realize that needed to develop a way to challenge myself and improve my personal knowledge of color and its potential. The process of challenging myself begins in chapter three.
In the third chapter, I present an exploration using the colors red, yellow, green, and blue, projected onto a dance. The exploration searches for new information which I have overlooked, misinterpreted, and/or never knew existed. The results of this exploration are presented as my observations and are not intended as definitive answers. As a result of this study, I have been inspired to create further explorations, which will lead to subjective possibilities, possibilities which I may incorporate into my future lighting design process. The experiment in chapter three should be noted as merely an example of the types of explorations I will be conducting in the future. The work is subjective in nature, and the conclusions are meant to be a resource upon which to build.
CHAPTER 2
AN APPROACH TO LIGHTING FOR DANCE

When creating the lighting for a dance piece there are several factors which I always take into consideration to decide upon my “foundation.” The term “foundation” refers to the fewest and most basic types of instruments I need in order to clearly illuminate a choreographer’s work. The “foundation” is determined by the areas which need to be covered by light, by the architecture of the space (to determine hanging positions for instruments), and by the available lighting inventory. Each performance I light has its own specific “foundation” determined by several factors. My first concern is the physical space which the dance uses: first, the floor plan that is created by the dance and second, the architecture of the space being performed in. Upon first viewing I look for the amount of floor space covered by the dance, areas which seem to be favored by the choreography, reoccurring paths upon which the dance travels, and any significant moments which instinctively leap out for me within the dance which might have to be accented by lighting. These characteristics help me determine the type of “foundation” I need to develop in order for me to light a work.

More often than not, the inventory (and budget) of a performance dictates the type of “foundation.” Since the dance concerts I light often consist of several very diverse works, it is often difficult to find one predominant characteristic which applies to all of the dances in a show. In these cases I
use a democratic approach. I try to create a “foundation” with at least one element which enhances each of the individual works but which is flexible enough to be used in all of the works. The more diverse the dances are the more difficult my choices can be. In these situations, I often try to create at least two side washes from each side, a back-light wash, and if possible (but used sparingly) a front-light wash.

Once the “basic foundation” is determined, I add instruments to further augment my design ideas, to the extent the inventory will allow. The architecture of the space in conjunction with the lighting inventory, and the space created by the dance needing to be lit, create a set of limitations which help me determine how I might develop my light plot. In effect, these limitations help me narrow down my focus. I find it an exciting challenge to design under extreme limitations of architecture and inventory in order to make a choreographer’s work visible.

Once the “foundation” is established, I begin considering the possible lighting angles which would most effectively illuminate the space as well as the dance. Often these angles are predetermined by the available lighting positions in a given venue. Lighting positions are either fixed, or the instruments can be moved to convenient locations on booms or trees, or the instruments can be part of a fly system (i.e. placed on battens lowered and raised above the performing space by a pulley system). Unconventional or alternative performance spaces often have no fixed lighting positions and thus allow a good degree of freedom in choice of hanging positions. Because of the lack of standard lighting equipment, hanging positions must be brought into these spaces (i.e. booms, trusses) allowing the designer to create the hanging positions.
Once the hanging positions of a given space are determined, I prefer that a dance light plot begin with direct sidelight washes from a high-side position. By using a high-side angle from both stage right and stage left a good amount of area can be covered evenly. This angle also "sculpts" a dancer's body, enhancing the three-dimensional qualities of the body. The high-side angle is also a natural feeling angle. Many light sources tend to originate or reflect from above and to the side.

As a body moves through space, direct side light tends to reveal the most illuminated surfaces as well as the shadows which enhance its three dimensionality. Light coming directly from the side (waist level or lower) tends to be dramatic, but not very natural. Direct side light sources could be interpreted as, or create the sense of, the light from a sunset, light from a fire, or even automobile headlights. These sources have a dramatic quality and are used only if appropriate for a particular work.

Though I feel it would be a rare situation in which I would use direct side light as the sole source of illumination, direct side light would be the first position I would add to my foundation following the high-side wash. Even though direct side light sources can seem overly dramatic when used in isolation, when combined with a high-side wash, they can efficiently cover large amounts of space. Light from these positions helps reinforce the "sculpting" effect on a dancer's body, and increases the total amount of surface covered on the dancer's body. With lights coming from high, middle, and low side positions, the performer's body can be clearly defined. Since the dancer "speaks" with his/her entire body, the better the body is seen the better chance its message has of being understood. Ideally, I would have a high-side wash, a head-high wash, and a shin-high wash in every one of my light plots.
Following direct side light, the use of back-light would be my next priority. I tend to think of back-light as serving two purposes. The most obvious effect of back-light is that it helps separate performers from backdrops. Adequate back-light wash can delineate a performer from the backdrop, especially when a good deal of front light is used. Used by itself, back-light has a dramatic silhouette effect, causing the body to have a slight halo around its edges. However, used in conjunction with side light, the "sculpting" effect on a body is increased.\textsuperscript{5}

Direct front-light, alone, tends to flatten a body. I feel it is best suited for illuminating two-dimensional media such as paintings. In a play or an opera, front-light is most often used to illuminate the performer's face (often considered the main source of communication in those media). Though I tend to use very little front light in my design work, there are certain dance situations in which it may be necessary, such as in the production of story ballets and work where facial gestures are considered important.

Once I have determined the washes to be used, I attempt, where architecturally possible, to achieve a degree of symmetry in the set up of the angles and distribution of washes. Symmetry should be established for several reasons. First, symmetry helps to create a sense of reality, since in everyday life, light generally comes from a number of sources (directly and indirectly). A natural seeming omnidirectionality can be achieved through the use of a symmetrical light plot. Another point to consider is that once symmetry is established, it is easier to create variations of asymmetry from a symmetrical base than vice versa. Further, if asymmetrical variation is desired, it can be created by variations on the symmetrical plot.
Ideally, I would have at least three washes from side lighting angles (from stage right and stage left), followed by a back-light wash. If inventory allows, I would increase the amount of side lighting angles and add possibly a diagonal back light wash. Finally, I would consider a front light wash. This variety of angles lends itself to what I would consider an ideal and flexible plot. From here I would go on to thinking about “specials”.

“Specials” are instruments which enhance specific moments in a dance that no other instruments in a basic plot can do. Usually, because of limited instrument inventory, I consider the availability of “specials” a luxury, and they are not something that I often add to my work. An image has to really strike me in the dance, and within the lighting which I visualize as I watch the work, before I consider using a “special” as a major part of my light plot. It is very rare that I use a single light source (or angle) to illuminate a dancer. I also consider the notion that if a work is toured, there is no guarantee that every venue will have an adequate inventory to recreate a design. Therefore, I attempt to design with a flexible plot so that when I come across a situation with insufficient inventory, I can still light the work.

Moments in which I use a single light source are usually reserved for overly dramatic situations, and usually do not last long. Even then, I tend to “fill-in” the body with other lights at very low intensities. I tend to use “specials” only when every other possible means to light the dancer, within a given light plot, is less than satisfactory.

Finally, I think about color. I think about color last because, for me, it is probably the most challenging, and intimidating aspect of lighting design. Taking the elements of lighting design into consideration (angle, intensity, movement, and color), I feel color has the single greatest potential effect on a
work. With a limited inventory, especially with instruments whose color cannot be changed between pieces, the ‘wrong’ color can have detrimental results. In such situations, placing a strong saturated color filter into a back-light wash, for instance, restricts the designer’s possible uses of that back-light wash to very specific contexts. A red back-light wash, for example, might not work for a diverse set of pieces on a concert, or for a full evening length work. On the other hand, in working with an unlimited budget, the designer can probably add as many different colored washes, from as many different angles as he/she wants. But there are a multitude of colors to chose from and the question becomes one of limiting choices.

Because of the challenge which color presents for me, I believe that clear illumination can adequately support the presentation of a work to an audience. Although white light (light without a color filter) has a good range of possibilities for enhancing a work, I believe that colors can have a greater influence on a work. A color can emphasize, or detract from, the emotional or dramatic content of a movement. A movement often has expressive undertones; my color choice may significantly affect the audience’s “reading” of the movement. The challenge is choosing the appropriate color for the desired result. How bold or saturated should the color be? Will the majority of audience members respond to the color as intended? Is it the ‘right’ color for the movement being shown?

What color, if any, should I use? I use color tints often and try to experiment with them, but never too boldly. I have a palette of favorite colors, that I would consider my “safe and efficient palette.” Light Bastard Amber Roscolux (Rx) 01 is a color I constantly rely on for bright illumination while conveying a healthy warmth. No Color Pink, Rx33, is my “workhorse” color.
This color helps tone down the yellow-green output of a lighting instrument (evident at lower intensities). Surprise Pink (Rx 51) is the color I often use to complement the Rx33. Though similar in function, Rx 51 has a cooler feel than Rx33. Often, I will use them from opposite sides of the stage to give the dancer's body a look of asymmetry, and to help with an ever so slight variation of coolness and warmth.

For a noticeably cool look I lean toward Lilac (Rx55) which can be very cold and icy, or Booster Blue (Rx62) which, although has a good amount of red mixed in, produces a coolness while maintaining a "healthiness" to the skin. The only saturated color I use, on a consistent basis, is Primary Blue (Rx80) and this may be more for its "work light" uses during transitions than for its effects on a given dance. I have never noticed the use of Primary Blue to have an adverse effect in the work I have done. Alone, or combined with other colors, it seems to be a color that "works" in most situations. I tend most often to use Rx80 in my back-light washes. Finally, I have an affinity for Chocolate (Rx 99). This color is probably the most comfortable warm color with which I have worked. Chocolate helps 'age' the performing area, with a "parchment-type" warmth, and conveys a sense of nostalgia for me.

These are the colors which I consider to be "safe" in any situation. The colors help suggest, but in no way (with the exception of the blue) do they make any truly bold statements.

I began to wonder about my limited use of color. Why do I not make a statement with color more often? Why do I hesitate to use bold saturated colors, or primary colors? Theoretically, primary colors can be mixed to make any color in the spectrum: why don't light plots implement just the primary colors to take care of all of their needs? Is my knowledge of color secure enough to
claim I know what to do with it? Hardly. In fact, I feel comfortable with only a handful of colors. These include the colors I have seen used over and over again in the past and the colors which other lighting designers have used and whose reasoning I accept.

I have attempted bolder colors in lighting rehearsals only to quickly replace them at the first sign of disapproval from a choreographer or visitor in the audience. Even though I might feel it appropriate to use a specific color, my choices are ones which I cannot sufficiently defend in the heat of a lighting rehearsal. It is usually not enough to say you have a good hunch about the color choice. So, unless my bold color choice meets with an immediate positive response, I usually quickly change it, to a safer color.

I have used saturated colors exclusively in only one dance piece, Expectation by John Giffin. The surreal nature of the piece called for the saturation, and I feel it was very successful. I have not used that approach since lighting Expectation.

When I think of using a color in my designs, I consider the point I am trying to get across to an audience, often in collaboration with the choreographer. The selection of a bold saturated color usually makes a very strong statement. I question whether the statement is too strong, whether it is appropriate in getting a point across to an audience, and whether it is the best choice for the situation.

This thesis is an attempt to analyze my color choices, as well as the meanings various colors have for me. The next chapter examines some of the color choices I have made in works lit during my graduate school years. These works were chosen because they were the ones which brought up specific questions about the color choices I made in my lighting design. They
made me rethink my own choices, and helped lead me to the experiment which comprises the second chapter of this thesis.
NOTES

1 See Appendix D for Sample Foundation Plot

2 The common format in modern dance performance is usually a combination of several different works often by several different choreographers (with very different intents) sharing a concert. Unless I am lighting an evening-length work which consistently maintains a certain theme, I must consider all of the works on a given concert when making my light plot.

3 The freedom of being able to create lighting positions often adds to the expense of a production, a budget is often the first thing to cut into a designer’s freedoms.

4 In order of preference, I would use a head-high position, then a shin-high position, followed by a waist-high position.

5 In some instances, down-light is often mistaken for back-light. These are two different angles which have two different effects. Down-light has a tendency to push down on a performer and make him/her appear smaller.
The flexibility would be increased by dividing up the individual lights within each wash into separate controllable channels. This is determined by the amount of circuits, channels, and dimmers.

My palette relies heavily on Rosco Brand Filters. See Appendix E for Roscolux Color choices.

Expectation was a work choreographed by John Giffin in 1991 based on Schoenberg's 1909 expressionistic work, Erwartung.
CHAPTER 3

LIGHTING DESIGN 1994-96: Graduate School Years

In this chapter I discuss select works I have lit in which my use of color has been especially significant. My work in designing for these dances has led me to question my use of color, as well as to realize the limitations of my approach.

Design for Precipice

Beginning in November, 1994, I designed the lighting for the solo work Precipice, by Karen Woods. This piece was presented on the Ohio State University, Department of Dance 1994 Resident/Visiting Artists Concert, in Sullivan Hall.

Precipice was a work using movement from the Cunningham vocabulary. The choreography, however, did not follow the familiar Cunningham aesthetic. Instead, this work was set in a specific order intended to support an intended narrative.

Upon first viewing, the narrative I pictured was that of a woman in a dark and dank log cabin situated on the edge of a forest, in the late evening. The
work began with the soloist in a position low to the ground, facing stage right. Before she even began to move, I envisioned a woman, alone, looking into a fire which originated from a large stone-hearthed fireplace. This image was so clear and strong in my mind, that I devoted a great deal of time to develop it.

The opening image led me to experiment with a new color, Rx50, Mauve, the color which I chose to use in the stage right shin positions, was beautiful for the opening scene. The color was saturated, and gave a warm damp thickness to the air. The dampness was of an earthy quality similar to dark wet terra-cotta pottery. The quality of the light supported the feeling of a dark and musty cabin. This color, without the aid of a set, helped convey the mood of the opening scene, and was to set the tone for the rest of the piece.

Following the opening image, my intent was to gradually open up the space with light. The scenario I imagined was that of the woman eventually walking out of the dark dwelling, and going out into the world. Metaphorically it suggested to me that the woman was taking that first step in leaving the assumed safety and comfort of her home, and going out into the "real world." If I create the sense that the opening scene took place before the fireplace, and made a subtle transition to the point when the woman left the cabin, I felt I could effectively place the action within my scenario without excessively manipulating the audience perception. My intention was to give the audience a starting point (the cabin) and the sense that the dancer leaves it. How she leaves the place or where she goes was intended for the audience to decide.
This beautiful opening scene, which conveyed the image in my mind so well, became troublesome once I attempted to open up the space. I had difficulty making the transition from the opening scene in the cabin to the rest of the work. Being restricted to the Sullivant Hall repertoire plot and color palette, which was much less saturated than the Mauve, I had used to begin the piece with, every attempt at a subtle transition was undesirably noticeable and awkward. The repertoire colors were of a democratic palette, typical of many gala type dance concerts. The colors chosen for the benefit of the majority of the pieces on this concert.

Although the transition from the first scene to the rest of the piece was undesirable in its lack of subtlety, I did not give up on the idea of using Mauve for the opening. I had found a new color which matched the vision in my mind, and I was reluctant to pass up the opportunity to use it. Instead of changing the Mauve to a color more suitable to the palette in the repertoire plot, I forced it into use. I decided the opening scene was too stunning to pass up, and instead sacrificed the smoothness of the transition. The decision to sacrifice a smooth transition troubled me because my chief criticism of the lighting design I have seen has always been the lack of smooth and subtle transitions between cues.

In retrospect, I realized that in maintaining the Mauve for the opening scene, I sacrificed my stage right shin wash for the entire piece. Lack of instrumentation restricted my ability to produce a Mauve wash with “ specials.”
Because the shin position was my most effective means of lighting the low-level movement of the opening scene, I was not able to light the stage right side of the dancer's body as effectively as I would normally have. Every time the performer came near the stage right periphery of the stage, she was lit by what at one time had been a very effective flame, but became an unsightly and noticeably out of place color. There was too great a difference between the tints of the repertory plot and the saturated Mauve.

The lighting I designed for this piece led me to think more about how much, or how little, I actually knew about color. The color choice I made for Precipice created a situation in which I was not able to come up with an acceptable solution. I attempted to use a bold new color for a specific moment, and was not able to make it blend with a very neutral repertoire palette. I had three other angles (head-high from both sides of the stage, as well as the stage left shin) in which I could have added colors to make the transition smoother, but my attempts were futile in the time allotted to light the work. I was grasping at straws, randomly selecting colors which I thought were "medium saturated," and thus potentially helpful for the needed transition. None seemed to work in my attempt to smooth out the transition. I began to see the limitations of my knowledge of color. I understood only the handful of colors which are my "safe and efficient palette."
Design for *Ah! Viscera Movere & Other Lush Works*

I lit several works by Alison Tipton, on the concert entitled *Ah! Viscera Movere & Other Lush Works*, for the January 1995 MFA Graduate Concert in Sullivant Hall. Once again restricted to the repertoire plot, as far as my angles were concerned, I at least had the option of changing the color palette. The palette I chose was more saturated than I would normally usual. Magenta (Rx46), Rose Purple (Rx48), Golden Amber (Rx21), and a variety of deep blues were my selections to help convey the theme of “lushness.” Due to the tongue-in-cheek humor of the works, a certain degree of “gaudiness” seemed appropriate.

Use of this new color palette, which I thought of as “lush bordering on gaudy,” made me hesitant in my lighting design. Because I am a proponent of subtlety in my lighting design, I was frightened by the array of saturated colors I had chosen to work with. I was not ready for such an extreme change. I found myself relying on combinations of washes which, when blended together, made some “safe” neutral looks. By using the principles of additive color mixing, I was able to neutralize all of these saturated hues. In so doing, I diminished any boldness which I was hoping to attempt.

In hindsight, I realize the works on this concert provided a situation in which I could have done little damage by going to extremes with my color choices. I realize I had a trepidation about using this saturated palette. Not knowing what this saturated palette could produce, I tried to make it do things
my “favorite” palette could. With my preferred palette, I have an understanding of what I can do to “fix” an undesirable “look.” I realized I had created a “safe haven” in my preferred palette of colors, and this was limiting my creativity.

The most revealing work, on this concert, in terms of lighting design was Moon. Moon was a simple adagio solo on a wooden bench whose meaning was open to interpretation.

Accompanied by Tony Bennett’s Fly Me to the Moon, Alison Tipton performed a work which explored movement possibilities while one is seated or lying on a bench. Simple in concept, and limited in its use of range, the dance is very appealing when performed well. From a lighting perspective, the restricted stage area led me to think of isolating the dancer. The music would inspire the mood.

In itself, the music did not give me a specific image to work with. Instead, the persona of Tony Bennett, suggested a cliché image of a park bench lit by a single street lamp. Using a saturated deep blue back light for background to represent the evening, I accented the dancer with a single shaft of white light, to represent the streetlight. In working with the music to inspire the mood, I felt the lighting effectively placed the dancer in a world associated with a Tony Bennett Variety Show skit. Many observers thought the tongue-in-cheek humor was evident in the lighting, and deemed it “appropriate.” After several viewings of the piece (during tech and dress rehearsals), I regretted not attempting to do more with the work.
The dance itself was a sustained *adagio* with no particular reference to
Tony Bennett's song, or even to a park bench. Tipton was costumed in a light
grey unitard. She moved through a series of tableaus using a steady bound
movement quality. The tableaus had no discernible narrative connection.
Realizing that I had gone with my first impression of the work in designing the
lighting, I acknowledged how mediocre my decision was. I began to notice the
many more challenging ideas I had not attempted.

A green wash might have given the dance a comedic science fiction
look. After all, Tipton wore a nondescript unitard, and the music spoke of flying
to the moon, and might have supported the science fiction approach. A red
wash might have been interpreted as a sarcastically lust-filled interpretation of
the Tony Bennett song. Using stark white light might have placed the dancer
on the surface of the moon. In using these other perspectives, I might have
challenged the audience, the choreographer, or myself. Instead, I limited
myself to an appealing commonplace image.

I noticed a pattern forming in my design work. I was approaching work
with ideas which were 'tried-and-true' to simply illuminate the work. I was not
challenging anyone by recreating lighting clichés. Was I simply interested in
being entertaining? I recognized a lack of exciting, challenging, or unique
contribution to the works I was lighting.
Design for *Changing Steps*

The 1995 University Dance Company concert, was next on my design agenda. This concert featured a work by Merce Cunningham, entitled *Changing Steps*. The thought of being able to light a Cunningham work in what I thought would be a "chance" approach was very appealing. However, my interpretation of "chance" was not possible for this performance.

Upon receipt of the Cunningham lighting specifications sheets I was disillusioned with the lack of "chance" in the lighting design.¹ The main and only objective of the lighting appeared to be the creation of an atmosphere within which the dance could be performed.² Abrupt changes were not permitted, as dancer safety was the key issue. The dancers needed to be able to see each other clearly, as they needed to take visual cues from each other throughout the dance.

Although it is true, that variation in the order of the sections of the dance on a nightly basis causes new "chance-like" changes under a non-changing lighting design, I was disappointed that the lighting was not done in what I interpreted as a "chance" approach. The lighting was required to follow a set of parameters which, if placed upon the music or the movement itself, would be considered unacceptable. I felt that given these parameters, the lighting design was not included in the Cunningham aesthetic of several independent mediums (music, dance, costume, set) sharing the same space.
For the University Dance Company's performance, the work remained in a set order for every performance. Without the usual "chance" approach of manipulating the order of the dance nightly, I thought it would be a good opportunity to at least vary the lighting nightly. This however was not permitted by the lighting specifications.

I began my approach to the work halfheartedly. My disappointment with the lack of opportunity to provide "chance" lighting, as I interpreted it, left me with a lack of motivation to explore something new. I did not attempt to use deep saturated colors for fear that they may be too dark for the dancers' safety. Also, the lighting specifications sheets had suggested the use of certain colors. So, where possible, I incorporated the suggested color, with my usual palette of color tints, and worked on creating some basic "looks."

I made several "looks" with long transitional cross fades, remaining within the parameters of visibility, clarity, and safety for the dancers. The only "chance" element I used was the time at which I called each cues. Each section had a specific cue, but I allowed a window of approximately 20 seconds within which I had to call each cue. This lack of precision cue calling allowed for some variation from performance to performance.

I did, however, do a good deal of color blending on the cyclorama (cyc). This was not exactly a challenge or ground breaking experimentation, as I often play around with color blending on the cyc just for fun, and formulas have been written to assist in color mixing. What I did discover was how the various cyc
colors would shift from one to the other. Some made nice sweeping changes which affected the overall mood of the space. Other colors tended to make a secondary color during the shift. I was most interested in the changing cyc colors when the shifts were "muddy" or less than appealing to look at. Because of the powerful visual aspect of the lit cyc, it was necessary to make cyc colors in each cue which made smooth shifts. Otherwise I would distract the audience from the dance. Unlike the more subtle, multi-angled color mixing which occurs within the performing area, the color mixing on the cyc has much more noticeable results. Serving more as a very noticeable set element, rather than as a source to illuminate the dance, a careful approach is needed to effectively compliment a dance. I had to make sure there were no "ugly" cyc colors or shifts which would detract from the dance. This color shifting process raised a few questions for me.

I found I understood the basic principles of additive color mixing, but it had never occurred to me that making a transition from one mixed color to another mixed color involved so many variables. Also, some of the "ugly" cyc color transitions intrigued me. They were not necessarily ugly colors; they were just very obvious and obtrusive. For instance, it was distracting to see a muted brown during the twenty second transition of one bold primary color to another. These "ugly" colors were merely inappropriate for the context of the cues I made for this work.

One "ugly" transitional cue intrigued me so much that I actually built a cue around it. Privately labeling it the "Vietnam cue," I based the blending on colors which created orange (red and green). The cue was a predominant
amber wash on stage, with an orange, revealing a lot of green, on the cyc. This was the only cue in the entire piece which you would not find in the basic eight color box of Crayola Crayons. The cue may not have entirely fit into the context of the overall design, but it moved me enough to work it into the performance.

In itself, the experience I had with *Changing Steps*, inspired several ideas. I became interested in trying to find a work to do my interpretation of "chance lighting" (a work which would allow for bold saturated colors). Also, it made me interested in further exploration of color mixing on the cyclorama, with notice paid to the transitions between the mixed colors. An exploration of "ugly" colors, in relation to primary colors, also interests me.

**Design for Rubbernecking**

I lit the evening length concert *Rubbernecking*, by choreographer Pam Tanowitz, in June of 1995, at St. Mark's Church in the Bowery, New York City. The concert consisted of two distinct halves. The first half was composed of four previously performed dance works, while the second half was the premier of a collaborative multi-media effort.

I lit the works from the first half for a concert in the late summer 1994 at the Third Avenue Performance Space (TAPS), in Columbus, Ohio. Because TAPS is a venue with a limited amount of equipment, I was forced to use a very basic approach (one which I sense has become a repetitive formula for me).
Using the basic washes available to me (one headhigh wash, two high-side washes, one back-light wash, and a front light wash) I lit the work with the intent of creating a clearly visible environment in which the dance could be performed. No extraneous lighting was done for lack of the necessary equipment.

Upon receiving the lighting information for the St. Mark's venue, I found the architecture of the space, the hanging positions, and the lighting inventory to be extremely similar to that of TAPS. I lit the works on the first half of the concert at St. Mark's almost exactly the same way I had lit them at TAPS. If it had not been for the premier of Rubbernecking, in the second half, I would have been able to light this concert without any effort at all. My experience with the lighting of Rubbernecking was perhaps the most significant point in changing my approach toward the way I look at color in my design.

Rubbernecking was a problematic piece. The set designer created a sparse set consisting of a large rear projection screen, upon which she projected slides. The images produced by the slides, were of brightly colored everyday objects distorted in a way to suggest a cross between “Pulp Fiction” and a Tim Burton movie. The slides would cycle through the piece at regular intervals and create the back drop for the dance.

The problem, in terms of lighting the work, came from the fact that the performance space had an interior consisting of many highly reflective surfaces. The floor was blond wood and all of the walls were an off-white color; the
carpeting surrounding the performance space was a light grey, and none of the
stained glass windows were covered. With so many reflective surfaces,
merely turning on the slide projector was enough to light the entire room.
There did not seem to be a way to keep the room dark enough to project the
slides clearly and also light the dance taking place in front of the projection
screen.

Realizing this complication, I advocated that the dance be the most
important component of the evening, while all design elements should be made
subordinate supporting factors. The set designer was reluctant to accept the
idea that her design be sacrificed for the sake of seeing the dance. No matter
how much I lowered the intensity of the lighting instruments, thus reducing the
visibility of the dance, it was never dim enough for the set designer’s images.

After seeing in dress rehearsal how little of the dance could actually be
seen, the set designer and I came upon a compromise. The set designer had
come up with an image of several constricted pools of light, each with a
saturated color, scattered throughout the space as the sole means of lighting
the dance. Although this idea would greatly benefit the clarity of the images on
the screen, and work effectively for some portions of the dance, I felt it would not
benefit the entire 26 minute piece. I went on to base my lighting design on the
set designer’s idea while also taking it a step further.

There were six instruments available for use as “specials.” Reserving
them specifically for lighting Rubbernecking, I gave each special a thick
saturated color, and focused it in such a way that it would not reflect directly onto the screen, there by reducing the amount of actual light transmittance as well as the amount of bounce light reflected from the blond wood floor. By using colors similar to the saturated colors found in the images in the slides, I felt I was able to tie the set design, lighting design and the dance together.

To add to the "Tim Burton" theme, each special was focused in a way to create a variety of shapes (squares, triangles, ovals) on the stage floor. The "specials" were arranged in such a way that, together, they would cover as much of the performing area as possible, while still maintaining enough distance from each other not to hinder the integrity of its shape. It was agreed that these six "specials" caused the least amount of damage to the slides, while doing a fair job of illuminating the dancers. These six "specials" (along with the rest of the light plot at extremely low intensities) were to be the tools for lighting the entire dance.

It was difficult for me to accept that the dance was being sacrificed for the sake of the set, since my usual approach toward lighting dance is, based on clearly illuminating the dance. Throughout the performance I found I wanted to increase the light levels. During the first performance, I had trouble seeing some of the small gestural and facial movements. Retinal fatigue would set in for me during sections of the dance which were confined to a specific area. Because I was limited to the six specials and their specific locations, I was not able to create too much variation with the 20% intensity repertory plot.
Once we completed the first evening's performance and were well into the second night, I started realizing a problem with the way I had approached this situation. Instead of trying to force my repertory light plot to work in this situation, I should have been looking at the potential of the saturated colors in the six “specials.” These colors, thick and saturated, were actually functioning well for this piece, once I put my biases behind me. In my narrow attempt to illuminate *Rubbernecking* with my favorite light plot and palette, I overlooked another possible way to light the work.

If I had transferred the idea of the saturated colors from the “specials” onto the rest of the plot, I could have done a better job of lighting the work. But, by limiting myself to using my light plot in the manner I am accustomed to, I suddenly realized how little creativity I was using in my lighting design. I realized how dependent I was on my “safe” light plot and my “safe” palette, to create “adequate” lighting design. I realized that I was not taking any risks, because I had the security of a lighting approach which was easy for me to fall back upon, and was very comfortable for me to use. By putting aside this bias and pragmatically observing the lighting of *Rubbernecking*, I realized how much potential there was, and how little I had done to bring it out.

**Deductions**

After close analysis of these works, along with others which used far less emphasis on color, I have come to the conclusion that I need to expand my
perception of color in order to produce creative and useful lighting design. By constantly relying on my “safe and efficient” palette, I realize I have been limiting my potential creativity, as well as creating a formula for what appears to be complacent lighting design production.

Had it not been for examining the above mentioned lighting situations, I do not think I would have realized how narrow my color range really is. I can now see that I have been relying on a handful of colors with which I can “adequately” illuminate anything. However, I do not want to do “adequate” work.

For some time I have been sensing a steady increase in the feeling that my work is becoming a “formula” which I can easily produce without any effort. I sensed a pattern of “problem solving lighting design,” which focused on illuminating a work in a given theatrical situation rather than on “collaborative input lighting design,” or creating a design which contributes to a work regardless of the theatrical situation. I seem to have reached a plateau in my design work, and I have been growing content with it.

This chapter has opened several avenues of exploration for me. My work on Precipice pointed out my limited knowledge of how colors blend. I could not find a way to blend the saturated Mauve into a palette of what I thought to be “democratic” colors. In Moon I realized how clichéd my lighting can get. Instead of challenging myself, or the choreographer, with new ideas, I chose the simplest design possible and only adequately lit the work. Thanks to the
color mixing of the cyc lights during Changing Steps, I discovered some of the "ugly" colors which exist in the color spectrum. That one of these "ugly" colors actually formed the basis of a cue, in a piece full of "prettier" colors was a realization which took me in a new direction. Finally, Rubbernecking revealed my shortsightedness, as well as my attachment to my "favorite" color palette. After the fact, I was able see how limited was my view of saturated colors.

The Next Step

With so many discoveries, I have come to the conclusion that this thesis begins what will be a life-long study of color in my lighting design. I undertake this with the understanding that it is unrealistic to claim I will find all of the answers in the course of this thesis. I would not even be able to answer most of the questions from the above chapter in this thesis. However, I will begin my exploration of color, and hopefully make some useful discoveries upon which to build.

For all practical purposes, the exploration in this thesis will begin to examine my ideas as they relate to saturated primary colors. I will be focusing on primary colors, and attempt to use them in a way which will be applicable towards work which may be presented before an audience. This exploration will examine each color in a non-performance situation to see how the colors affect what I see, and to evaluate its potential use in a performance situation. A reevaluation of my preconceived notions of specific colors will be inevitable.
NOTES

1  See Appendix B

2  In an interview with Jacqueline Leschaeve, from *The Dancer and the Dance Merce Cunningham in conversation with Jacqueline Leschaeve* (pp. 173), Merce Cunningham states “Well, the general idea always has been with me that you should just light (laughter). By that I mean the way sunlight lights the day; like, if you look out here [Scheveningen, near the Hague], you see it lit” and “We never like lighting to focus, to dramatize something.” I find lighting to have its own dynamics, very much like dance does, yet in the Cunningham preference it appears that lighting should not explore its range as does the movement within a dance. It is merely there to make the dance visible.

3  See Appendix C

4  Retinal fatigue occurs when the eye does not receive continuous varying stimulation. Prolonged exposure to an unchanging scene causes the eye to fatigue. Variation of the scene helps reduce the chance of fatigue.
CHAPTER 4
DESCRIPTION AND EXECUTION OF EXPLORATION

The premise of my exploration is based on the principles from a Dance Composition course I had taken from Professor Vera J. Blaine. In this composition class, the students explore the movement qualities of resiliency, lightness, strength, and locomotion in their extreme ranges. In each instance, students create two to three minute studies exploring a specific quality. The basic principle for this type of exercise is to allow the student to capture the essence of a movement quality and be able to draw from this ‘extreme’ experience when creating future compositions. Having created a three minute study using a particular quality, the student has experienced a quality which will hopefully be remembered by his/her muscle memory and will be available for future use.

I took into consideration Blaine’s approach toward creating an “extreme” experience, and devised an experiment which I could apply toward lighting. Instead of taking movement qualities to their extremes, I decided to explore colors to their extremes. Since color is the focus of this thesis, I decided to explore what are generally accepted as the three primary colors: red, green, and blue. When mixed at various intensities, these three colors theoretically have the ability to produce any color in the spectrum. “There is nothing unique about red, green, and blue as primary colors except that, on a practical level, they produce the widest range of colors when combined” (Palmer 42). I have
added the color yellow to the study because the accepted primary colors
"cannot combine to make a bright spectral yellow" (Palmer 42). These four
colors, red, yellow, blue, and green are the basis of my experiment in that they
are the four colors which I will begin to explore in an "extreme" situation. As in
the Blaine composition class, I will take each of these colors and use it as the
sole source of illumination for a substantial portion of a dance work. My next
step was to find a dance (and a dancer) willing to repeatedly perform a work
under my intended lighting conditions. Kathy Carbone, a local
choreographer/performer agreed to perform her solo work entitled "Like a Nest
and a Thicket."

This work lent itself to my exploration in several ways. First, the work
uses several clear movement qualities such as, lightness, resiliency, and
strength. Second, the solo is divided into three distinct sections and spatial
areas. This spatial distinctiveness allowed for some interesting variations in my
exploration. Third, Carbone is a very responsive dancer willing to share her
experience and feedback. And fourth, the relative shortness of the work makes
it reasonable to perform many times in two-hour sessions.

My first idea was to light the work under each color and analyze what I
saw after each run. However, having read a considerable amount of literature
concerning the causes of retinal fatigue, as well as having myself experienced
retinal fatigue on several occasions, I chose to vary my approach in a way that
would be more conducive to the way I would actually light a work. Also, having
read a considerable amount of literature on how each color is supposed to
make the viewer react, I felt that this type of experimentation would be basically
a subjective addition to the already extensive list of meanings of color.
Instead, I felt that by lighting each of the sections of the dance in a different
color, I would be able to reduce the effects of retinal fatigue, while still being able to begin exploring the effects of extreme color changes within a work. This exploration, I have found, has created several variables which have pointed out many possible directions for future exploration. These variables will be discussed in greater detail in the next chapter. In this thesis, I will attempt to restrict my analysis to the color extremes upon the dance, while noting the areas of possible future exploration.

Description of *Like A Nest and a Thicket*

The first section of *Like a Nest and a Thicket* consists of slow elongated *adagio* movement interspersed with accents of quick light movement. Since, according to Carbone, the piece deals with exploration of time, it was evident that she deliberately chose to work with contrasting slow and quick movement. This section takes place in the downstage right area of the performing space. The *adagio* section lasts approximately two minutes, and when complete Carbone walks directly to the area designated for the second section.

The second section takes place upstage center. Once in place, Carbone begins a series of quick, light, thrown movement phrases. Compared to the first section, this section is brief. When a dancer moves at a quick, but steady pace, viewers acclimate to what they are seeing. This acclimation causes the movement to appear as if it is slowing down. The brevity of this second section is necessary in order to counter this effect.

After the second section, Carbone stops and walks directly to the downstage left area of the performing space, and begins a slow sustained section. A bound and strong quality is the dominant feature of this section as Carbone maintains a steady pace while moving her body through various
levels.

The basic spatial structure of this work, three distinct contained areas, allowed me to use a very simple approach for lighting this experiment. A single light source, a 750W six-inch fresnel, was hung directly above the center of each area. The beam created by these instruments was wide enough to cover all of the movements within each of their respective areas. Each instrument would have a different color, which would be part of a predetermined rotation. Each time the piece was performed I would begin the next rotation by shifting the colors one place over, giving each area, a new color. This rotation of color would continue until each area was exposed to each of the four colors once. Four performances of the work were needed to achieve the full rotation of colors.

First Rotation: Red-Green-Blue

The first rotation of colors was as follows: area one = red, area two = green, and area three = blue. Although my selection process for color order was random, I did notice that in this rotation I went from lightest to darkest.

Under the red light, the first section of the piece appeared somewhat oppressive in nature. The color was so saturated that it made the space appear thick. As Carbone performed her elongated movements, they were enhanced by the thickness of the light. Her body appeared to be struggling to move through the red air which, in turn, made the movement appear agonizingly slow. As this section continued, the red appeared to be getting thicker; as if layers or darker shades of red were being added to the scene as the movement continued. The quick movement accents, which Carbone performed in this section, were suppressed by the thickness. The effects of the
color did little if anything to help bring out these quick accents.

For the *adagio* movements, this color works well by enhancing the slow quality; however, it is oppressive in nature and adds a layer of meaning to the work which may not be appropriate for the choreographer’s intentions. In this situation, the oppressive nature of the color seemed to effectively diminish the intensity of the quick movements, making these movements seem much slower than they actually are. This leads me to wonder whether a section containing contrasting movement phrases needs contrasting lighting choices.

When Carbone moves to the next section, her transition from the first area to the second area consists of approximately nine feet. By walking from the red light into the green light, the distance traveled appeared to be much further than that. Her physical size seemed to diminish, making the illusion of distance seem that much greater. This illusion of distance was so shocking that it took my eyes a moment to adjust, rendering them unable to view the first few movements Carbone performed. Once adjusted, I was able to see the way in which the green colored light failed to enhance this section.

The speed of Carbone’s movement seemed to be significantly slower than usual. The thickness of the color created this impression. Within the green light, Carbone had the appearance of being submerged in a green gel-like liquid, which made the speed of her movement seem barely faster than it was in the previous section. The thickness was not as great as it was in the previous red section as it did not give the connotation of a growing oppression. Instead it maintained a level which did not seem to change throughout the duration of this section.

The green colored light did not give me the impression of horror or illness which I normally associate with green. The movement being performed,
did not suggest the unkind images I have always associated with green light. I have witnessed the unfavorable effects of green light on my own skin and have seen it usually used to light horror themes. I found no such connection in this experiment. Instead, I found the green light effective in enhancing the feeling of distance, and in creating submerged effects. Use of Primary Green appears to suppress quick movement phrases. But the most obvious, and first noticed effect of green light is that of the distance it helps creates.

When Carbone completed the fast section and moved into her final *adagio* section, several effects occurred. Her walking into the blue light from the green made the blue area appear very warm, an effect which differed strikingly from my expectations. Even with its association to horror and illness, I always assumed green to be a warmer color than blue due to its position in the color spectrum. Instead, the transition to blue increased a feeling of warmth. In addition, the blue light appeared to enhance the visual clarity of Carbone's movement. I felt as if there were additional light sources illuminating this section. The effects of the blue light made this section visually comfortable and calming. The sustained movement quality, clearly visible, was supported well by the blue light.

In viewing the entire piece, under this color rotation, the blue light in the third section of the dance seemed to be the most appropriate match for the movement quality being presented. This third section appeared to be the least threatening, or challenging, for the viewer. The lighting choices for the first two sections seemed to work against the movement qualities they illuminated. In some circumstances, especially when the choreographer wants to challenge the audience, such effects may be valid in dance lighting. In the first section the choreographer may want to find movement that is not easily suppressed by
the red thickness. It may also be to a choreographer's advantage to try to make the movement quality of the second section fast enough to offset the effects of the green light. As a lighting designer, the 'negative' effects of red and the green light may be appropriate for certain dances, especially since not all dances have a 'positive' message. The effects of transitions from one color into another color appear to have a significant effect upon the colors, at least till the point at which the eyes adjust to the change. Further exploration of color transitions will be necessary.

Second Rotation - Yellow-Blue-Green

In this rotation, area one = yellow, area two = blue, and area three = green. For the yellow area, the color filters were doubled so as to create what visually appeared as a true saturated yellow. When using a single filter, a white light was produced rather than a desired yellow.

The most noticeable aspect of the yellow light is the immediate clarity and brightness it produces. Even though two filters were used to achieve a recognizable yellow color, the transmittance of light was barely hindered, in comparison to the colors used in the previous rotation. The body of the dancer was clearly visible and well illuminated. While the level of thickness, which had been evident in the darker red and green, seemed non-existent.

The first impression I had from this light was that of Carbone in a room, bathed in a strong beam of yellow sunlight pouring through a window. The yellow light created a high contrast against black void surrounding the performing area. Compared to the colors in the previous rotation, one notices the defining quality of the yellow light. The yellow light seemed to cut through the space and define its area, whereas the other colors seemed to diffuse at
their periphery and blend into the surrounding blackness. This contrast of light and dark which helped define the area helped draw all of my attention to the performer. It was easy to see that she was the center of attention.

As I watched this section progress, my initial dramatic image of a beam of sunlight in a room began to dissipate. As I watched, the dramatic effect which held my attention seemed to transform. I began noticing things about the dancer. Most notably her skin tone began to change. Primary Yellow is an unflattering color upon the skin that creates the impression of illness or jaundice. In a way it was exciting to see this appearance of ‘sickness’ overcome the performer, even though it did not show in the movement. I felt that the dancer was surrounded by a disease which was affecting her physical appearance, but due to the consistency of the dancer’s quality of movement, she appeared not at all affected by the disease.

The scene began to take on a surreal quality. I noticed more of what the light was doing to the dancer’s body, and less of the actual dance. Her movement, in itself, did not hold my interest, as it was competing with the effects occurring around her. My impression of this scene was that of a person being slowly sucked into, or transforming into, a “film still.” By the end of the section, Carbone seemed to be an image performing within a celluloid frame.

As Carbone finished the section, her departure from the first area seemed rather abrupt. She took approximately five steps to get from the yellow pool of light to the blue pool of the second area. The illusion of distance was evident. This sense of distance was supported by the dancer who claimed she felt physical and emotional distance, as well as perceptual distance during her transition. Carbone claimed walking from the yellow to the blue was like going from one extreme to another. The reaction of the dancer was surprising
when compared to the previous rotation’s transition, from red light to green light. I did not see as great an illusion of distance from yellow to blue as I did from red to green. This surprised me since I had always been under the impression that the greater the contrast between colors, the greater the transitional effect would be.

Besides lending an increased sense of depth, as compared to the previously used green light, blue light seemed to increase the energy of the performance. The blue light, although somewhat thick in nature, had a cool mechanical feeling aiding the movement’s appearance of precision and quickness. Compared to the first section under yellow light, the clarity of the body’s definition had diminished. A greater sense of shadow was achieved, as the diminished amount of reflected light from the floor did little to round out the body. Instead, the specific body contours caught the light as they moved through it. These quick moving body contours appeared as flashes of blue light as they moved through the space. These flashes gave a layer of meaning to this section in that they seemed to be creating an energy of their own, lending speed to the movement. Primary Blue would not have been my first choice for use in this high energy section. Normally, I associate feelings of calmness and serenity with blue light. After this exploration, I see the potential for blue light to be effective, on its own, in situations which do not necessarily reflect calmness or serenity.

Moving into section three, the performer was met with green light which actually appeared greyish-white. It did not have the thick distant quality seen in the previous rotation. In this situation, the green light appeared almost neutral and clear. Visibility of the dancer was greatly improved, over that seen under the blue light. The common association of green with the horror genre again
was not evident, although the space did convey a sense of colorless gloom. While under the green light, the performer underwent a transformation in appearance. She appeared grey at the beginning of this section, but gradually her skin took on the color of a golden brown or rust color. The green color affected Carbone's skin tone making her skin appear bronzed.

In this particular situation I found green to have an adverse effect upon the work being presented. An evident bleakness in the beginning of this section, followed by the transformation of the performer's skin tone, did nothing to enhance the adagio movement being performed. The light actually distracted from the movement by drawing attention to the change in skin tone rather than in the movement.

Third Rotation- Blue-Yellow-Red

In this rotation, Primary blue is used for the first section, the double filtered yellow for the higher energy second section, Primary Red for the adagio third section. This is the first rotation to use two lighter colors and only one of the darker, as well as one traditionally cool color along with two traditionally warm colors.

When Primary Blue was projected onto Carbone in the opening section, it appeared to be warm in nature. The feelings I got from this section were those often associated with blue: calmness, serenity, and liquidness. While Carbone's performance maintained a steadiness of movement quality, her elongated adagio movements were well supported by the serenity of the blue light. The color of the light did not seem to deter any of the movement's intent, and supported the slower sustained movement. It did not, however, help bring out the quality of the quicker accents. In fact, I felt it neutralized these accents.
Visual clarity was not a problem, even though my usual association with blue, being a darker color, is that of a lowered light output. The blue light was bright enough to show the performer's body clearly. In viewing the opening section I had gone from complete darkness into this first blue scene, which may have affected the clarity with which I saw Carbone's body. Possibly too, since there was no preceding reference point from which to judge depth, the opening section lacked the illusion of depth seen in the previous rotations. The dancer had no opinion either way about this lighting decision.

When Carbone walked upstage into the yellow light, the illusion of depth seen in previous rotations had been reversed. The yellow light actually made her seem larger, especially in comparison to the impression of her size as seen under the blue and the green lights. The yellow light had an effect which enhanced my ability to see her body clearly. This, in turn, made the movement appear clearer. Under the blue and the green light, the lack of detailed clarity in seeing her caused blurred after-images to occur when watching the movement. These after-images trailed her arm swings. Under the crystallizing effects of the yellow light, the speed enhancing blurring effect was less evident. However, the movement appeared much faster without these trailing effects of light. The clear image of the dancer's body showed the speed with which she was actually moving. Without the blurring effects, Carbone seemed to be moving much faster than she had in the previously used colors.

Carbone noted that in walking from the blue light to the yellow light she felt the yellow light to be too bright. She felt the brightness was stifling, and she really did not want to enter the yellow light or attempt the quick movement designated for this section. Having seen how much quicker the yellow light made her appear, and knowing her dislike for the situation, it would be
interesting to see how fast she could have moved if she were less apprehensive about the color situation. Having completed this portion of the experiment, I did not want to bias her opinion by retrying this situation later.

The most startling findings occurred with the next transition. The dancer stopped, and had second thoughts about entering the red pool of light for the third section. Carbone claimed that she was afraid to enter the red-lit area. It appeared too dark for her. She eventually did, however, enter the area, and was promptly colored a pretty shade of magenta/pink. This made the hesitancy seem a bit comical. Gradually, as she continued through this slow sustained section, red began to overpower the magenta/pink. As the strength of the red increased, the adagio movement appeared to be affected by the color. The dance phrases seemed longer and appeared to require some effort to fulfill. The red light lent itself to creating a sense of oppression. The red color would work well in pieces dealing with oppression, or Kafkaesque works in which someone is overcome by something which he/she cannot control. In Carbone's work, the effects of the red light were not appropriate.

To Carbone, the section felt very alien. She did not want to enter that area, and then felt uncomfortable when she did. The suppressing effect which was visible from the audience, was actually suppressing the dancer. In watching the thickness of the red light grow throughout this section, I felt that had I not faded the lights at the end of this section, the increasing effect of the saturation would have eventually reached blackness on its own. This seeming progression to total darkness felt as though it would have happened very quickly.
Although I expected that green would be dim and thus provide a lack of clarity, as well as a feeling of distance, I found that green light had some surprising qualities for this section of Carbone’s work. The effects of green on Carbone’s skin tone were startling as she appeared to be well tanned, and the definition of her body was very evident. The contours of her muscular arms and legs were accented by the fact that the light made her bronze body easily seen. This “bronzing” effect was not, however, proceeded by the transformation from grey, as in a previous rotation.

An isolated calmness was the predominant feeling I got from this section. As the dancer moved through her sustained phrases, the quick accents did not seem to be diminished. The accents actually seemed appropriate for this color. I felt the green lights had a curious effect on me. Though usually a color which I had associated with the traditional color of horror scenes or with illness, in this situation I saw neither horror nor disease. Instead, I felt a calmness which may have been in great part due to the nature of movement phrases. The green light, having some similarities to, and sharing some of the calming qualities most associated with blue light, seemed appropriate for the mixed speed phrases. The green did not make a bold statement about the mood; instead, it made me curious and caused me to question what image green created. It is common to say red equals fire, blue equals water, and yellow equals sunlight. What color does green equal? This situation has disproved my belief that green equals horror or illness.

Carbone felt the quality of the green light was very similar to the quality of the blue light when used in this opening section. However, she felt the green light had a good deal less weight to it. She also had less of the feeling that she
was covered by a filminess than she had under the red and blue lights. She said the red and blue made her feel as if a soap scum, or a thick filmy liquid was applied to her body as she moved within it. She claimed that she had an emotional preference for the green light in this opening section.

Moving on to the second area and color, Carbone felt an urge to enter the red colored pool quickly. She felt a "charge" stepping into it. She experienced a great contrast in her emotions, as compared to that of her previous journey from yellow to red. The feeling of her having entered a red hot furnace fire came to my mind as she took her place. The energy she derived from the color came across as a power. The bold effects usually associated with red were very evident in this section. Her energy, coupled with the strength of the boldness of red, made this transition very effective. In this situation, red seemed to be the most appropriate color, in bringing out the quick light thrown movement. Heat, fire, energy, and power were images created by the combination of the red colored light and the movement being performed.

Upon leaving the red pool of energy, and making the transition into the yellow light of the third section, the performer seemed as if she had jumped out at the audience. In a matter of traveling four or five steps downstage, Carbone seemed much larger and nearer than she actually was. Besides the unnatural illusion of tremendous size growth, her skin took on a sickly pall (bordering on the grotesque). This may have been mostly due to her having made the transition from red to yellow because, as my eyes adjusted, the dancer became visibly clearer and the tone of her skin started to gain a healthier feel. As my eyes adjusted to the yellow, a calming effect grew around the image of the dancer. The length of this section allowed me enough time to adjust my eyes from the shocking red to yellow transition, but did not allow the yellow to
revert back to a jaundice effect of a previous rotation.

The performer thought she was walking into very bright white light. She acclimated to the light very quickly, and felt that I had not even had a color in it. Of all the situations, she claimed this one felt like natural light and she felt comfortable working in it.
CHAPTER 5
CONCLUSIONS

This thesis is not an attempt to find a correct answer for my lighting design questions. I do not believe there is such a thing as a "right" choice, in a field as subjective as lighting design. Instead, this thesis has stimulated me to reevaluate my approach to lighting design for dance, especially on my use of color. In examining my approach, I have discovered a few of my shortcomings, with regard to designing, especially my dependence on a certain palette of colors. By finding these shortcomings, I have also found a basis from which to begin new avenues of exploration.

The first chapter pointed out the approach to lighting design which I have been developing. I had realized that this approach depended too heavily upon a formula. The formula was based on my conception of the "basics" for lighting dance: good stage coverage from a symmetrical light plot using a palette of colors which can safely light a variety of pieces. Since the "basics" were the objective of every light plot I created, I came to the realization that I was creating a "formula" from which I could work. This formula had become an obstacle in my creative process. Although the formula seemed efficient, I realized it had created a degree of complacency in my design work. Though I still believe the basics of the craft are an essential, and valuable point from which to begin, I realized the need to use these "basics" more as a guide rather than a crutch upon which to depend. In hindsight, I saw that by using my

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formulaic approach I was able to perform merely adequate work, which required little effort on my part. I was rationalizing and justifying my methods by the efficiency with which I was illuminating dances. I had confused creativity with efficiency. Efficiency, I have come to realize, did little to either enhance or challenge the works I was lighting. In effect, the more efficient I was, the less time I put into the work, thus stifling any real creative effort. Realizing the negative aspects of the approach I had been developing, I decided to begin taking apart my formula and developing a new approach. In this thesis, I chose to focus on the use of color in my design work.

In the second chapter, I placed emphasis on recent works in which color played a major role in my design choices. I needed to see exactly what I was doing with color, and why. I discovered that attempts at exploring new colors revealed a lack of ability, on my part, to incorporate these new colors into my existing “favorite” palette. I noticed that I did not attempt to develop a variety of palettes for various situations. Instead, I depended on one “favorite” palette. Closer examination began revealing the stereotyped lighting I was producing. I realized how little challenge I was presenting to a given work, and that after the first produced viewing of a work I was regretting my design choices. Color has the ability to greatly affect the meaning of a work, and I was not exploring the possibilities this element can offer. Instead I often stayed with the first design that came to mind.

Although I knew some of the basic principles of additive color mixing, as well as some of the properties of color filters, I realized I was not applying this knowledge towards my work. I knew what worked in my formula, and I seemed to be content with this limited range. The accidental discovery, or realization, that there were “ugly” colors that appeared during the transitions between
colors opened up some new ideas to explore. The relationship between primary colors and these “ugly” colors also sparked my interest. Saturated colors, with their ability to diminish the intensity of light transmittance is common sense, in hindsight, but it was not evident to me until I lit the dance called Rubbernecking. The observations made in this chapter helped point out how limited my scope was. I realized I was trying to make every situation fit into my formula, thus narrowing my approach. I acknowledged a need to begin challenging myself. I decided to begin creating a series of explorations which would enhance and challenge my design work.

In the third chapter I began the process of breaking down the complacent approach which I have inadvertently been developing for myself, by creating an experiment to challenge myself and my knowledge of four primary saturated colors. The experiment is completely subjective and does not search for all the answers. In fact there are no answers here. What I present here is an exploration upon which I hope to build.

Since my emphasis is on lighting design for dance, I chose to loosely base my experiment on the teaching methods I experienced in a Dance Composition class taught by Vera J. Blaine. Based on the idea that using a movement quality in an extreme manner helps develop a better understanding of that movement quality, I tested color to these extremes, in hopes of developing a better understanding of each color. Taking into account the knowledge I had gained about color extremes, I created an experiment which allowed me to explore the potential of a given color. Having a dance piece repeatedly performed under a series of colors gave me the opportunity to witness first hand some of the potential uses of specific colors. The discoveries made have not only challenged my preconceived notions of color, but have also

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renewed my awareness of the knowledge of color which I posses, yet take for granted.

Because of this experiment, I have come to the realization that I have not been allowing myself the opportunity to freely play with color ideas before I lock into a specific narrative or image. Once I lock into a premature association of a color with a specific movement it becomes hard for me to let go of it. This experiment has helped me to realize that colors have several potential uses which I was not aware of due to my preconceived notions and lack of exploration.

Prior to conducting this experiment, I would never have thought green might have a positive an effect on someone's skin-tone. This discovery not only dispelled my preconceived notions, but inspired me to begin experimentation on the effects of various colors upon various skin tones. Exploring the effects of various colors on a multiracial cast is my next area of exploration.

Seeing that blue can appear a a warmer color than green, has led me to rethink the way I view the color spectrum. Having always assumed that the color spectrum was a good indicator of warmness to coolness with red being the warmest and violet the coolest, I can see that circumstances can alter these perceptions. This discovery has led me to want to find other circumstances in which a generally accepted cold color can be portrayed and accepted as a warm color, and vice-versa.

The experiment also helped me realize, that various surprising effects occurred because of transitions between colors. I have observed that by beginning in a particular color a reference point is established for the viewer. For example, when dancer Kathy Carbone began in blue light, her movement conjured up images of water. As a result, this became my reference point for
the rest of the piece. However, when the dancer made the transition to a new color, the results tended to surprise me. More often than not, my preconceived notion of the second color was challenged by the transition. Besides challenging my preconceived notions, other effects occurred. Visually, the size of the dancer seemed to grow and shrink, sometimes in exaggerated ways, depending on the color entered and exited. Also, besides affecting the viewer, the various transitions from color to color affected the dancer as well. These transitions alone have opened up several options of future study including: transitional effects on the dancer, transitional effects on the viewer, as well as effects on the anticipated preconceived notions of colors.

In the future, I plan to explore each color further, for I made several startling observations. For instance, when the color rotations came to yellow, the effects were most surprising. Anticipating images of warm golden sunshine, I found yellow to often have a disturbing effect on the dance. Besides the occasional unpleasant jaundice pall to the skin, yellow seemed to have the ability to transform the entire scene, the longer one watched it. Most surprising was that even though I, as the viewer, often found its effects to be undesirable, it seemed to have no adverse effect from the dancer’s point of view. Also, the color red, with the property of boldness which it is often associated, is a topic for further examination. Like yellow, red seemed to transform the image viewed. Prolonged viewing of a dancer under red light causes, besides retinal fatigue, what appears to be a gradual darkening of the entire viewing area. Some of the most generally agreed upon associated meanings with red including blood, heat, love, etc... seem inefficient and I feel I have not yet scratched the surface of the possible uses of red.
In closing, I feel the work I have done in this thesis has opened up a new direction for me in lighting design. I have been able to recognize the limitations of the approach I had been using and the complacency which was a result of the limitations I put on myself. I have begun a new exploration of color which I hope will challenge my knowledge of its uses, as well as enhance my lighting design. The experiment, merely the example of the type of work I am now embarking on, is a subjective look at the possibilities of color, and is not an attempt to find a conclusive answer. My findings in this thesis are a resource from which to expand.
APPENDIX A

Thesis Proposal
Effects of Colored Light on Movement:
How Red, Yellow, Green, and Blue Colored Lights Affect Movement as Perceived by an Audience

A Thesis Proposal

Presented in Partial Fulfillment of the Requirements for the Degree Master of Fine Arts in the Graduate School of The Ohio State University

by

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The Ohio State University
May 8, 1995

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Effects of Colored Light on Movement:
How Red, Green, and Blue Colored Lights Affect Movement as Perceived by an Audience

Due to the lack of comprehensive written materials pertaining to lighting design for dance, the goal of my research is to contribute a body of contemporary work to the field of dance lighting. This thesis will focus on one aspect of dance lighting: the use of colored light and how it affects the audience's point of view when projected onto a dance piece. This thesis will eventually contribute to a larger text I am developing which deals with the field of dance lighting. The main goal of the larger text will be to give a dance lighting designer a thorough and practical resource that at present seems unavailable.

In the field of lighting design, the number of published books dealing with dance in a comprehensive fashion, is minimal. In 1971 National Press Books published Dance Production Handbook or Later is Too Late, by Lois Ellfeldt and Edwin Carnes of the University of Southern California. The editors' intent was to create a manual for dancers and choreographers. The main body of the text explains everything necessary for the production of a dance concert, specifically the administrative and the technical aspects. Ellfeldt and Carnes devote only one chapter toward lighting design, giving brief general descriptions about all of the following lighting elements: mood, emphasis, variation, color, special effects and light plots. It would be extremely difficult for a dancer or choreographer to light a concert, or even communicate with a lighting designer, using only the very general information provided in this text.

Another example of the lack of dance lighting literature is Dance The Art of Production, edited by Joan Schlaich and Betty DuPont. In the preface the
editors state, "this book is designed as a practical guide for the director or choreographer of a dance production." The disturbing aspect of this book is that the authors feel a practical guide toward lighting design for dance can be achieved in one chapter. The contributing author dealing with lighting design is Doris Siegel, a member of the faculty of the Dance Department at the University of Southern California. Although Siegel provides several photographic examples of lighting effects, a sample light plot with related paperwork, and a checklist of things a lighting designer needs to be aware of (dealing with people in the theatre), she gives little practical guidance to the director or choreographer. Only an exceptional dancer or choreographer could read this chapter and walk into a theatre situation and light a dance.

The most recent publication, Dance Composition and Production (second edition) by Elizabeth R. Hayes, deals with dance composition as well as production. Once again, only a single chapter is devoted to lighting, and it discusses lighting instruments, illuminating the dance movement, use of colored light, and collaboration between choreographer and lighting designer. The topics are discussed briefly, and incompletely. As a comprehensive guide to lighting design they are inadequate.

Besides these dance specific texts, theatre lighting books, and several lighting periodicals, were examined. Many theatre lighting books devote a section to dance lighting. Most of these sections are less substantial or helpful than the work of Hayes, Elfeldt, or Schlaich & Du Pont mentioned above. Most of the theatre lighting texts reference the works of Hayes, Elfeldt, or Schlaich & Du Pont, and vice versa. Though all give a general idea of lighting for dance, few give any practical or in depth advice. It seems that the texts written, pertaining to lighting design for dance, focus on giving a designer some
basic knowledge of the ‘tools-of-the-trade’ and then tossing the designer out into the real world to figure things out for him or herself.

Periodicals occasionally print helpful articles on dance lighting. Tom Skelton’s series "Handbook of Dance Stagecraft", printed in Dance Magazine (1955-57), was a series of “how-to” articles printed over a two year period in monthly installments. In these articles Skelton explained choices he made in lighting design, and why he made those choices. He even suggested further research and experimentation to achieve individual styles. Skelton’s articles are practical, insightful, and helpful guides in dance lighting. The only problem with this series is that it is not current. Although most of the principles discussed in the Skelton series may still be applicable, the material refers to equipment which is now obsolete or seriously dated.

Occasionally, TCI (formerly known as Theatre Craft) and its sister publication Lighting Dimensions print articles pertaining to dance lighting, none of which come close to the comprehensiveness, or practical application of Mr. Skelton’s body of work. The research I have done in these two publications is disappointing. The last time either of these two publications printed an article dealing with dance lighting was in October of 1993, and that was a biography of a dance lighting designer.

Due to the lack of in depth studies in lighting design for dance, my thesis will focus, in depth, on one aspect of dance lighting. I will explore the use of colored light and how it affects the audience’s point of view when projected onto a dance piece. Specifically, I will explore how the colors red, green, and blue individually affect a dance piece from the audience’s perspective. The dance pieces will consist of literal easily recognizable movement phrases. The movement phrases of each dance will be determined
by survey responses from a dance audience. Each dance will incorporate the responses for each individual color. Thus, a red dance, a blue dance, and a green dance will be created. Literal easily recognizable movement phrases will be used so that an audience member can identify each dance. By lighting a dance under colored light different from its type, an audience reaction should occur. This study will examine if, and how color affects the audience's interpretation of the dance.

The purpose of this study in a long-term sense, is to contribute to the field a comprehensive, and in depth, body of work dealing with lighting design for dance, of which my thesis will be one component. This projected body of work would deal with explaining dance lighting methods and approaches, show examples of lighting for different types of dance and performance spaces, give historical references and examples, as well as describe recent work in the field. It will also present studies dealing with the tools available to dance lighting (color, angle, space, instruments, etc...), and explore new ways of using these tools. The main goal of this body of work will be to give a dance lighting designer a thorough and practical resource. A complete text of this magnitude will take several years of research, experimentation, and documentation.

Color research is integral to several fields. In the field of psychology, studies have been done to show the effects colors have on people. In 1942 psychologists determined "red is the color of choice of the manic and hypomanic patient giving the tumult of his emotions their 'burning' and 'bloody' expression" and "yellow is the color of schizophrenia... This yellow is the proper and intrinsic color of the morbid mind" (Birren 1982). Later, Fabre Birren determined yellow is closer to feeble-mindedness, while blue would be the choice of schizophrenics. Birren points out that artists such as Van Gogh
favored yellow, and Kandinsky, the abstract painter wrote, "Yellow is the typically earthy color. It can never have profound meaning. An intermixture of blue makes it a sickly color. It may be paralleled in human nature with madness, not with melancholy or hypochondriacal mania, but rather with violent, raving lunacy." Birren determined green may "be associated with Freud's oral character"; "it is often the choice of persons who are superficially intelligent, social, who are given to voluble habits of speech, and who often have an intense appetite for food." According to Birren, green is the favorite color of psychoneurotic and psychotic individuals, and blue is the color associated with schizophrenia. It should be noted that Birren's studies pertain to architectural lighting: Birren is considered an authority in his field and his work in color is still accepted today in many circles.

It is common to see books on advertising discussing the "right color" to sell a product. For example, Dale Russell has created a series of books called The Designer's Ultimate Guide to Working With Color. Each volume is devoted to a specific color. Several examples from this series deal with the marketability of certain colors. Red is known as a high profile, eye-catching color that creates an aura of activity. Blue has a masculine association. Blue is also a safe color associated with travel and transportation. Yellow makes objects look larger and stick out. Each color according to Russell has a specific meaning or association, and 'using the right one' can help when selling a product.

The color research, mentioned above, deals with individuals exposed to colors and the effects the colors have on these individuals. In psychological testing the individual is placed in a room and exposed to colored light, for extended periods of time, to determine any behavioral changes. Mentally disabled individuals are asked to pick their favorite colors to determine any
patterns or trends relating to their disability. Products are packaged in different colored containers to see which colored packaging sells the best. Artists have researched and developed color theories as they apply to art, primarily with pigment. The symbolism of color in art also has been extensively studied.

Having surveyed the color research of other fields, this thesis will examine the differences or similarities which exist between the present color theories, and the use of color in a dance piece. I question the established theories in other disciplines which have placed peoples' reactions to color into specific, neat little categories. Can color research which applies to inanimate objects apply to the animate action of dance? Will a dancer, performing a calm, smooth swimming action, under a bright red light, be considered angry, bloody, or sexually passionate? Or, will the audience members change their minds about their preconceived notions of the color red, and consider red to be a calm watery color? If a dancer is violently thrashing under a calming blue colored light, will the audience still find blue to be a color associated with calmness or safety? Will they feel the blue light might be the cause of the rage in the dancer? Will a green light always make a healthy dancer appear ill or envious? Can a shivering body under a yellow light mean warmth? These are a few of the questions to be explored in this thesis.

The method I intend to use for this research will consist primarily of a survey, with an experimental component. Surveying a dance audience would be the most logical way to find a dance audience's reaction. The dance audience is the 'consumer of the product.' Surveys are considered very effective methods for examining products, and obtaining opinions. Though the interpretation of color research from consumer surveys is what I question, the method of obtaining these results seems valid, and appropriate. The survey
method will permit me to, assimilate the opinions of a select group of people.

The design of this study is as follows:

1) preliminary (pilot) survey of audience's feelings toward the colors red, blue, and green.

2) analysis of preliminary survey- to determine if the audience feels the same way about color as determined by psychologists, advertisers, and/or artists and their existing color theories; to analyse the responses to determine if wording of questions is clear, and meanings of questions are understood; to obtain material for generating a literal movement dance piece.

3) creation of movement pieces consisting of movement phrases determined from the preliminary survey. I will choreograph solos incorporating literal movement phrases derived from the surveyed audiences preconceived notions of color. (i.e. if a color is associated with being cold a literal movement may be shivering). These phrases will be presented to random passersby in impromptu situations to determine if they truly carry the literal meaning intended. (The passersbys will include anyone who is willing to participate) These phrases will then be randomly linked by chance (within each color) and presented as individual dance pieces.

4) Survey II will be distributed during a dance concert. An expanded version of the pilot survey. This survey will deal with in-depth questions concerning color and movement. The literal movement dance pieces may be presented during this survey under their corresponding colors.

5) codification of Survey II results.

6) performance of the movement pieces before an audience under
colored light different from the color corresponding to the movement.

7) Survey III—survey of audience reaction to the movement pieces under non-corresponding colors. This third survey will be similar to Survey II. It will have a question pertaining to participation in Survey II. Repeat respondents become the sample group of this survey.

8) codification and analysis of Survey III— to determine similarities and differences in responses to Survey II, and differences and similarities to existing research of color theories.

The participants for this research will consist of the dance audiences of the Ohio State University, Department of Dance. The surveys will be conducted in Sullivan Hall Theatre, and Department of Dance facilities. The goal of this survey is to obtain the opinions of at least 200 audience members. Data collection will consist of audience questionnaires. Deborah Richter, a freelance modern dancer in the Columbus area, will perform the literal movement dances.

Data collection will consist of three audience questionnaires. The questionnaires will consist of a combination of open-ended and direct questions. The first questionnaire (pilot survey) will be presented to audiences of several dance concerts. The questions will help determine what the participant associates with each color.

Once the experimental component (the dance pieces) is complete, the second questionnaire will be distributed at the performance of the abstract dance piece under the red, blue, and green lights. The second questionnaire (Survey II) will expand on questions from the first questionnaire, focusing on color and movement. This questionnaire will be presented to an audience at a concert containing the literal movement dances under their corresponding
lights.

Survey III will then be distributed during a concert which presents the literal movement pieces under non-corresponding colors of light. This questionnaire will be similar to Survey II with an additional question for the purpose of selecting a sample group.

The method for analyzing this data will consist of a coding system. Once the preliminary (pilot) survey is completed and analyzed, a concise survey (Survey II) will be developed and presented to an audience. This survey's results will be codified and tabulated. Once the literal movement dance piece is presented, along with Survey III, and the results codified in the same manner as Survey II, the results will be compared.

The responses of Survey II & III will be compared to determine if the spectators' opinions of color have changed and what effect if any was derived from the movement and lighting choices.

Anticipated chapters for this thesis are as follows:

Chapter 1  Review of Existing Color Theories in Lighting Design and Other Fields
Chapter 2  Description and Results of Survey I (pilot)
Chapter 3  The Literal Movement Piece
Chapter 4  Description and Results of Survey II
Chapter 5  Description and Results of Survey III
Chapter 6  Findings
Chapter 7  Significance of the Study
Chapter 8  Conclusion

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This research is significant in that my findings will contribute to the field of lighting for dance, and to theatrical lighting in general. Existing literature is lacking in the field of dance lighting. There is no significant literature pertaining to the uses of colored light for dance. Therefore this research, which will be a part of a greater volume, will make available a significant amount of written usable material. My anticipated findings include: a clarification of the possible effects of colored light on dance as viewed by an audience; a challenge to the notion that specific colors categorically create specific meanings or feelings; a new tool for choreographers, and other creators of the performing arts, to use when developing work. Primarily, the findings of this study will be most helpful to the field of dance, dance education, and dance lighting. The results of this thesis will help choreographers, dance educators, and dance lighting designers make more informed choices when creating their work. The findings of this study will hopefully lead to more experimentation within the field of lighting design, and the performing arts.
Annotated Bibliography

   Covers all areas of producing a dance concert. Administrative, Design, Managerial, and Technical aspects of producing a show are discussed, and suggestions for each category are presented. Appendices include suggestions for minimum requirements for studio performances, and sources for "goods and services." A short glossary of basic theatrical terminology is followed by a substantial reference list. No index is included, however a well organized glossary more than makes up for it.

   Basic comprehensive textbook for scenic design and stage lighting. Covers historic, conceptual, and practical approaches to scenic design and theatre lighting. Many illustrations, and black and white photographs. Complete glossary of pertinent terminology. Extensive "Additional Readings" section. Detailed index.

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Practical, informative, and comprehensive. The author gives his advice from an experiential point of view. Only series of its type in this periodical.
Works Consulted


APPENDIX B

Lighting notes for Changing Steps
MERCE CUNNINGHAM DANCE COMPANY
Aaron Copp, Production Manager
Tel - (212) 691-9781
Lighting Notes for CHANGING STEPS
originally designed by: Charles Atlas

This dance was originally done at a time when the Cunningham Dance Company toured with a "Lighting Designer" who was making artistic decisions on the fly upon arriving at each theater. The nature of the piece is such that the order of the sections within the dance was changed at Merce's discretion for each performance. Consequently, the lighting design for Changing Steps has never really been "recorded" or noted like a normal repertory piece would be because of the constantly changing nature of the dance.

So, bearing all this in mind a few simple rules should be set forth to establish how this will be done. First, regarding physical setup:

- Black dance floor covering the entire stage area
- Black masking legs and borders
- White Bounce or Scrim

The background can be done by using a white bounce/translucency and black scrim combination, which may fit better in concerts where other more traditional modern dance repertoires are being done.

However, the preferred method of lighting the background in the Cunningham Company has always been to frontlight the scrimma directly. This is usually because many of the Cunningham repertory pieces have their own individual backdrops designed and painted by visual artists. They are by and large seamless and painted in such a way that they can only be frontlit, so even when we have a piece that is simply a white or monochrome color background we don't change the cyc lighting setup. Also, front lighting allows for a much bolder color field on the backdrop.

As far as the lighting itself goes, the best place to start is the Cunningham Company plot, which has remained fairly constant in its basic ideas for many years. We have always had 3 systems of frontlight - a blue, a pink, and clear. The blue is currently R80, and the pink is G190. There are 3 systems of backlight - blue, amber and clear. The blue is currently R79 and the amber is R20. For pipe ends we have 2 systems - R57 and clear. Each of these is a pair focused near and far (near actually being just short of near quarter and far being just short of center). There are 4 units per boom, and either 4 or 5 booms per side, depending on the stage depth. The top 2 units are another near and far pair at about 12 feet and 10 feet high. The next unit down is at 8-10 feet high and the last unit is a split. There is sometimes a mid unit at 3 feet, but no pieces in our current repertoire call for it. All booms units change color at each intermediate, although that has not always been the case. For cyc lighting we try to get a 4 color wash, although sometimes the theater's equipment limits us to 3.

The notes for Changing Steps indicate only a rough outline of the actual lighting ideas that went into making the piece. They call for cyc washes in primaries: red, blue, green and white. A color correction like L201, 202 or 203 should be used in the white wash. The costumes are brightly colored units, so side-light color should be chosen to highlight the bright costumes as much as possible against the background.

Cycling of the piece should be subtle and smooth. If the piece is staged in such a way as to localize certain sections to specific areas of the stage (for example, if the second dance takes place entirely upstage left) then either special or individual circuits of the washes can be used to highlight that area. In the spirit of the original, this is at the designer's discretion. We also may not have to deinterlace each and every part of the dance. There were occasionally only a couple of cues written for this piece, although it was usually more. The cycling should not involve drastic, sudden changes and should always be bright enough to allow the dancers safety in the movement. The movement in the Cunningham repertory is generally quite difficult and involves the dancers taking many sight cues from each other and relying on each other for safety and balance. Go for white rather than "showy".

Please feel free to call the Cunningham Studio if you have any questions.

Figure 1. Lighting notes for Changing Steps - Copy of facsimile from the Cunningham Studios.
APPENDIX C

Color Mixing Chart
| RESULTANT COLOR | PERCENTAGE OF FULL LIGHT % | | | |
|----------------|----------------------------|---|---|
|                | Red | Green | Blue | |
| Blue           |     |       | 100% | |
| Violet         | 8%  |       | 100  | |
| Cerise         | 50  |       | 100  | |
| Magenta        | 100 |       | 100  | |
| Crimson        | 100 |       | 66   | |
| Red            | 100 |       |      | |
| Orange         | 100 | 40    |      | |
| Yellow         | 100 | 80    |      | |
| Amber          | 100 | 100   |      | |
| Apple-Green    | 66  | 100   |      | |
| Green          |     | 100   |      | |
| Bluish-green   |     | 100   | 80   | |
| Peacock-blue   |     | 80    | 100  | |
| Turquoise      |     | 20    | 100  | |

While pastel colors can be formed by the simple mixture of white light, many can also be formed with the primaries only, as Williams further charts:

| RESULTANT COLOR | PERCENTAGE OF FULL LIGHT % | | | |
|----------------|----------------------------|---|---|
|                | Red | Green | Blue | |
| Lavender       | 33% | 20%   | 100% | |
| Mauve          | 66  | 20    | 100  | |
| Salmon Pink    | 100 | 80    | 100  | |
| Pale Green     | 33  | 100   | 100  | |
| Sea Green      | 8   | 80    | 100  | |
| Sky Blue       | 8   | 20    | 100  | |
| Pale Lemon     | 100 | 100   | 35   | |

Figure 2. Two tabulations of light mixture - assuming that the three primaries are balanced, from Rollo Gillespie Williams, *Light for Color and Form*, rpt. in Tom Douglas Jones *The Art of Light and Color* (New York, 1972)
APPENDIX D

Sample Foundation Plot
Figure 3. Sample Foundation Plot as described in Chapter 2.
APPENDIX E

Rosco Color Chart
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*New colors 1994

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Figure 4. Rosco Color Filter Chart. From Spring 1994 Rosco Products for Production Catalog.
BIBLIOGRAPHY


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