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From the Footlight to the Spotlight:
An Examination of Theatrical Lighting Design

An Honors Thesis Submitted in partial fulfillment of the
requirements for Honors Studies in Theatre

By
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Introduction

In the penultimate moment of Frederick Knott's crime thriller *Wait Until Dark*, the protagonist – a blind woman named Susy – finally faces off against the violent Roat who has been trying to retrieve a doll filled with cocaine from her apartment. After attempts to deceive her and gain her trust in order to get the doll, Roat's last efforts must involve violence. But what he assumes will be a quick fight with a blind woman is actually anything but as Susy – always one step ahead – has turned off every fuse in the apartment except for one to take away Roat's vision when the time is right and give her the advantage. When produced for the stage, this climactic scene happens in a complete blackout, filling the audience with suspense and causing the same confusion that Roat is feeling. Throughout the scene there are brief moments of light, whether it be from a match Susy lights to threaten the gasoline-drenched Roat, or the refrigerator door that Roat opens to outsmart Susy, but apart from these moments the audience is left with only their sense of hearing and ability to pinpoint sound in space in order to figure out what is going on.

In my senior year of high school, our theatre department chose to do this play for the fall show. My role in the production was a combination of assistant director and stage manager, and therefore I worked a significant amount with our director to make the show into something special. It was clear from early on that we would be staying true to Knott's intentions regarding the blackout, even getting permission to use fireplace matches that were cut to size but could produce a far brighter flame to increase the dramatic tension. Up until that point my interests in theatre centered almost entirely in sound, but this show opened my eyes to the power of lighting, and from there my love for the medium was born.

Theatre is an artform composed of various different disciplines all working in unison to produce an experience unique to the audience that is present in that moment. These disciplines include any aspect of production that you can think of, ranging from the acting itself, to the clothes worn by performers, all the way to the music that plays in the audience before the show begins. When producing a play you can go as large or as small as you want, choosing to either lean into the spectacle that so many people love the theatre for, or simply allow the words and the performance to take the audience's attention. But, even in the most bare-bones productions, there is one element of design that needs to be considered: light. Controlling what the audience can and cannot see is a critical component in being able to experience the story being told.

This paper will explore the question of how one could approach lighting a theatrical production. To do this, I will first introduce some foundational information about the science behind the medium, before beginning the exploration into the artistry that is inherent to lighting. I will then discuss what light contributes to a scene, how it can be manipulated creatively, and some of the methods and styles that have been developed over time. Finally, I will take a look at lighting through the lens of my own experience lighting the University of Arkansas's production of *Hedda Gabler* in February of 2023.

How Lighting Instruments Work

Many people would not associate the art of theatrical design with the discipline of mathematics, let alone physics, but in reality the technical work that is done in the theatre is deeply rooted within science. Unsurprisingly, the medium that the lighting designer uses is light, and in order to control that light a designer needs to have at least a fundamental grasp of the physics that affect it.

A wide variety of lighting fixtures are used in the theatre today, with each one serving its own specific purpose. Within this wide variety, there are three fixtures that are fairly representative of the types of lights one would most commonly see used in a stage production: the ellipsoidal reflector spotlight, the Fresnel spotlight, and the PAR can fixture. The first of these, the ellipsoidal reflector spotlight, can be fundamentally understood by just looking at the fixture's name, as this light makes use of an ellipsoidal reflector to guide the light produced by the lamp inside through the lens in a variety of beam angles. An ellipsoidal reflector with a lamp placed at F1, as shown in Figure 1, would result in all light beams passing through F2 after a number of reflections. In an ellipsoidal reflector spotlight, the front half of the reflector would need to be removed (image *B* in the figure) resulting in a large angle of light being projected from the source lamp. Therefore, kickback reflectors, as shown in image *C*, are added so that light that would be lost out of the front of the reflector is directed back into the ellipsoid and focused onto point F2 again. The light that leaves the reflector then passes through the section of the instrument where shutters are placed, as seen in Figure 2. These shutters allow the lighting designer to shape the spot that lands on the stage away from its ordinary circular form. These shutters are positioned in a plane similar to that of F2, resulting in a sharper final product (Gillete, 342). Then, after passing through the shutters, the light passes through two lenses that bend the light into an appropriate field angle. As seen in Figure 3, the type of ellipsoidal reflector spotlight used determines this field angle, which in turn determines how far away from the stage the light can be positioned while still being used effectively. Finally, the light passes through the front of the fixture where a colored gel can be used to turn the light into the color that the designer sees fit. One of the advantages of this fixture is that its design makes it possible to light a small spot on stage with a short field angle while the light is positioned far from the front of

stage. Alongside this, the introduction of the second focal point at F2 means that not only can shutters be used to shape the light, but gobos can be used to give the spot texture. Gobos are metal cutouts that can project any sort of shape that is cut into them, and they are often used by designers to give atmosphere or imply scenery that is not actually present. Without the ellipsoidal reflector this control over the beam produced would not be possible, which is why ellipsoidal reflector spotlights are so widely used in the theatre.

The next lighting fixture that is most commonly used in stage lighting is the Fresnel spotlight (Figure 4). This fixture, unlike the ellipsoidal reflector spotlight, has a relatively short length from the lamp to the lens. This is because the Fresnel spotlight works in a simpler way, with little more than a lamp, a reflector and a lens. The light emitted from the lamp goes out in all directions, and the reflector placed behind the lamp is there to direct light that would otherwise be lost back through the lens in the front. From there the light passes through a lens and out the front of the fixture. The lens used in this type of fixture is – like the name indicates – a Fresnel lens, which is a form of step lens in which the glass is cut on the convex side rather than the plano side. This cut results in a thinner lens that allows for more light to pass through as well as reducing the amount of heat the lens absorbs, making it incredibly useful for theatrical lighting (Gillete, 334). The light that goes through the lens passes through the front of the instrument where it can be passed through a gel or passed through the “barn doors” on the front of the light. These barn doors are able to be positioned in front of the light so that the beam can be shaped similarly to how the shutters on an ellipsoidal reflector spotlight can shape the beam (Gillete, 347). The primary advantage of this lighting fixture is that the position of the lamp itself can be adjusted within the fixture. This means that its field angle can be changed from that of a spot where a tighter area is lit with more light when the lamp is near the back of the fixture, to

more of a wash light where the light is dispersed over a larger area and is able to create a flood of light over the stage when the lamp is close to the lens (Figure 5).

The last lighting fixture that one would likely find in a modern theatre is the PAR can lighting instrument (Figure 6). This lighting fixture is about as simple as a lighting fixture can get, with nothing more than a lamp, a lens, and the metal housing around it. The lamp inside of a PAR can is very similar to what one would find used as the headlights of a car, and because of this the light produces an intense beam with a diffused edge. While this light is not always used in the theatre due to the lack of means of controlling the beam, the light is often used within dance and concert lighting because it can provide a bright and energetic look that can carry color well (Gillete, 350).

The Artistry of Light

Lighting design is inherently a practical element of theatre as it allows an audience to see what is being performed, but, at its core, modern lighting design is storytelling, just like every other aspect of theatre. Yes, a play could be performed under the overhead lights that are built into the theatre's architecture, but that can create a barrier to the suspension of disbelief upon which theatre relies. By turning off the room lights and instead using even a minimal set up with actual fixtures, a designer is able to pull the audience into the world of the play, allowing the story to resonate in a stronger way.

That being said, a lighting designer should go further than just turning on a handful of fixtures pointed at a performer, and should utilize angle, color, shape, intensity, and the conventions that audiences have grown accustomed to in order to build thoughtful and intentional designs that fit the world that the director and their creative team have built. For example, a show like *Hamilton* could be performed entirely under work lights, but when the task

of lighting the production is given to a renowned designer like Howell Binkley the lighting transitions from a necessary practical element to a completely developed artistic effort in and of itself. In *Hamilton*, Binkley was able to create a design that both aided the story being told and became a prominent part of the visual of the world. The shafts of light created by the fixtures hanging over the stage are utilized to emphasize the order of soldiers preparing for battle, while the sudden floods of white light coming from off stage show the chaos of the battle itself. A tight spotlight tracking an actor's hand across the stage transforms that hand into a bullet slowly making its way towards its target, while a mass of lights spinning with the stage turn a turntable into a hurricane. When in the hands of the right person, lighting can take our suspension of disbelief and use it to create amazing visuals on stage.

But to create beautiful light you need to understand the medium and the ways in which it can be manipulated. One of the first of these methods of manipulation that a designer has to consider is the angle of the light source in relation to its target. Before a designer can turn on any lights and work on building the looks they will use in a show, they have to determine both where in space the light fixture will exist, and where in space it will be throwing light. The relationship between these two points determines the angle at which the light will illuminate the subject, and even slight changes in this angle can translate to significant differences in the way that a subject appears sculpted. In the book *Scenography and Stage Technology* author Willard F. Bellman wrote, “Not only will lighting determine where the audience is looking, but how they are seeing. It can make facial expression highly visible, giving prominence to those expressions that denote strong emotion, or it can reduce faces and figures to two dimensions” (381).

A light placed directly in front of an actor close to head height will, when pointed at the actor, provide good illumination but will tend to flatten their facial features (Figure 7). A light

placed behind the actor will provide a highlight around their form that can visually separate them from the background elements of the scene's composition (Figure 8). Lights placed on the sides of the stage may not provide the most practical illumination, but they allow for sculpting that helps to bring back out the three dimensional form of an actor that front lights may take away (Figures 9 & 10). These are the primary angles a designer will use when creating their design, but they are by no means the limit. A designer could choose to place lights below the actor and aim upwards, sculpting the face in an unnatural way to emphasize a character trait or narrative element. Or maybe a designer is using a lighting angle that has no relation to the actor and is instead meant to interact with the architecture of the set to create dynamic visual interest and texture. No matter what angle one chooses, a designer needs to know how that angle will affect the appearance of the beam.

The element that is often next to be considered when creating a design is color. Color is one of the qualities of light that people are most likely to notice, and therefore it is important to make thoughtful choices in regards to how it is used. The most fundamental color that a designer can use is white, but even something as simple as white is actually far more complicated than it may initially seem. For instance, within what we call "white light" there are a number of color temperatures that have their own predetermined connotations (Bellman, 420-422). A 2700 kelvin (K) white light leans away from pure white and towards an amber, while a 6000K would start to shift into the blue wavelengths. If a designer wants to use white in an interior of a home, they may opt for a color temperature closer to 2700K, but if the scene takes place outside it may be a better choice to aim for the 5000-5500K range, as these are the temperatures of white that the audience will most associate with the intended environment.

There are practically limitless color options once one moves past just using white, and while it may be tempting to begin using all the colors at your disposal, it is important to first understand their effects in order to justify their use. In art class one learns that the primary colors are red, blue and yellow, and by using a combination of those colors one can mix any color one needs. Light has a similar principle, but there is one primary difference: the primary colors of light are red, blue and green. A designer can use these three colors to mix what they need, or they can use their desired color directly, but either way they need to understand the two methods by which color mixing in light works, which are discussed in J. Michael Gillette's *Designing With Light*. The first of these, additive color mixing, occurs when different colors of light – such as red, green and blue – are projected onto the same part of the stage and are perceived as a new color of light (Gillette, 102). For instance, when the three primary colors are additively mixed in equal portions they result in a white light being perceived, but if only blue and green are mixed they will result in the secondary color cyan. The other method of mixing is the one more commonly used in the theatre and is known as filtration color mixing, or subtractive color mixing. This mixing occurs when white light is projected from the front of a lighting fixture through a colored gel, or filter, that blocks all wavelengths of light other than the color of the gel itself (Gillette, 102).

Getting the desired color of light to be produced by the fixture is only one part of the equation, as once that color hits the stage it will react differently to the various colors that already exist in the set and costumes. A deep red light may seem like a strong artistic choice, but along with its impact on the audience comes an impact on the color of the costume designer's work. Saturated colors tend to interrupt our perception of an object's original color, and therefore one must be careful when choosing color so as to not change the work of their colleagues on the

design team (refer to Figures 11, 12 and 13 for examples). This is not to say that strong color cannot be used, it just must be used thoughtfully – as is the case with all elements of design. For instance, in his essay “Color Concepts in Lighting Design”, theatrical lighting designer and educator Lee Watson details how he used deeply saturated pinks, ambers and blues in the original production of *The Diary of Anne Frank*. He stresses the importance of proper color mixing when using saturated colors of light, and his Tony winning design for that production shows how careful mixing can produce natural colors that possess “more richness and more variety than any color obtained through the use of a single pastel color media” (Watson, 257).

When working with light, a designer also needs to consider the shape that the beam will produce, whether on the performer, on the scenery or even in the air. Shape of the beam is determined by a number of factors, of which one is the angle of illumination. A circular beam would look circular when aimed perpendicularly at a wall, but if one instead positions that light above or to the side of the wall then the circle will instead appear as an ellipse. However, the primary way that shape of the beam is determined – at least when using an ellipsoidal reflector spotlight – is through the manipulation of shutters. As previously mentioned during the discussion of lighting physics, shutters are an element of ellipsoidal reflector spotlights that can allow you to shape the beam into various angled shapes. This control of the beam can be used to specify a distinct area that the designer wants illuminated, such as the interior section of a door frame, or it can be used to add angular shapes of light that add visual interest. Along with the shutters on an ellipsoidal light, one can use gobos to further shape the beam. These can be used to add texture to a scene – with the ability to further manipulate their sharpness by changing the distance between the lens and the lamp – or they can be used more literally to represent shapes like trees or skylines. Finally, by swapping out the degree of lens within the ellipsoidal reflector

spotlight, a designer can control the size of the beam that is being produced. For instance, a 19° lens barrel will produce a tight, small spot while a 50° lens will produce a much larger spot.

All of these methods of shaping the beam can be used in combination to further control the light a designer is producing on stage. This shaping can have a significant effect on the audience's perception of the stage ranging from literally helping to draw their attention towards different details to making the world of the play appear larger or smaller than it otherwise would. It can also be used to add a sense of movement on stage, which can be seen in the 2019 touring production of *Les Misérables*, which featured a lighting design by Paule Constable. One of the most memorable parts of that production was the imagery during the song “The Second Attack”, during which the set was composed of improvised barricades that the characters were using as cover. The set by itself would have already been beautiful, but the way that Constable’s lights interacted with the physical form made it into something much more powerful. The sharp angles and harsh lines created by the light shining through the barricade helped to create the feeling of movement and the chaos of the battle, and turned the moment into a dynamic image that brings the world to life.

One of the last lighting manipulations that a lighting designer will utilize in their work is that of intensity. Simply put, intensity is the level of light that is being output from the fixture, and the associated brightness that we perceive because of it. Intensity can be a strong way to establish the mood of a scene, as a dimly lit room will read inherently more dramatic and tense than a bright room will. But, like the shape of the beam, intensity’s best use may be its ability to pull the focus of the audience around the stage. Our eyes are inherently drawn to the brightest point in our field of view, so by keeping a specific area in a scene more brightly lit – such as the immediate area surrounding a performer – the audience will naturally be drawn to look in that

direction and will be better able to focus on the story. Or, in a play that has a heavy amount of scene transitions, a designer could utilize varied lighting intensities to draw the audience's attention towards narrative action and away from the physical scene change itself, while still keeping us in the world of the play.

The Conventions of Theatre Lighting

Now that we know the main methods through which light can be manipulated on stage, we can begin to look at the conventions that theatre makers and goers alike have come to accept and expect when they enter the theatre. Conventions can be understood as a foundational set of guidelines upon which a designer can build their design, and they can cover anything that an audience could have an association with, whether it be a mood sparked by a certain color or a style that we associate with a specific genre of play. In his essay "Style in Lighting Design", theatre scholar Richard H. Palmer lays out some of the conventions that are in place in regards to style, and his classifications provide valuable insight into how we may begin to think about these conventions. Palmer writes of various styles of lighting design, and from them we can broadly categorize his conventions into two categories: realism and abstraction. In realistic styles of lighting such as naturalism, pictorial and suggestive realism the lighting seen on stage needs to read as an attempt to recreate the look and feel of the real world. This means that the "source" of light within the world of the play must have a tangible motivation, such as the sun or an indoor lamp, and furthermore any lighting shifts made during the duration of the play must either be noticed subconsciously by the audience or also have a realistic motivation that keeps the audience immersed (Palmer, 144). Under the umbrella of realism there are more specific styles that each come with their own conventions, for instance pictorial realism's emphasis on the recreation of beautiful lighting effects and images, or suggestive realism's willingness to forgo

strict realism for the key characteristics of an environment, but they still are all rooted in an effort to recreate the world around us on the stage (Palmer, 144).

In abstraction a designer has more range in which to play with light, as the boundaries of realism no longer apply. A strong example of abstract lighting comes through when utilizing the surrealist style. Surrealism is characterized by Palmer as an effort to depict not the natural world, but the world of the subconscious, where lighting is allowed to pull from the mental states of the characters in the play rather than the environment around them (146). In surrealism and more generally in abstraction, light is often allowed to take more of the attention in key moments, allowing it to be a more direct tool for storytelling than when used in realistic ways.

Style is not the only type of convention that exists in the world of theatre lighting, and one of the elements of light that is most likely to hold specific connotations within an audience is color. Color has the powerful ability to evoke emotions within the viewer in a very rapid manner, and just by changing the primary color of a scene a lighting designer can completely alter the mood. There are some obvious color conventions such as red evoking feelings of anger or imagery of pain and death, or blue fueling feelings of calm or somberness, but what I find more interesting than that is the more ambiguous connotations that a color like green carries.

In the book *If It's Purple, Someone's Gonna Die* by film scholar Patti Bellantoni, she explains the mixed connotations we have regarding the color as both a symbol of health in flora, and a symbol of danger in the atmosphere (160). She then writes the following about green:

Because of green's ambivalent nature, it is important to base your decision on which green to use in a particular scene on how the audience is going to respond to it. It is crucial to have a clear vision of what it is you want. (Bellantoni, 161)

In the theatre one must choose to use green with even more caution because green light, when shone on an actor, will not always interact positively with skin tones. Under a green tone of stage light an actor could appear sick, so when green is used on stage it must be a deliberate and powerful choice. In the Broadway production of *Moulin Rouge! The Musical* there is a song called “Chandelier” in which the characters pass around a bottle of absinthe, and seeing as the drink is famously green, that scene of the musical exists in a flood of green tones. While it would certainly be a misstep if the lighting designer Justin Townsend had not chosen green for the number, the choice of such a strong color has an additional and far less obvious effect of pulling the audience out of the established world of the play and into the dream-like, absinthe-fueled trance that the characters are experiencing. Audiences, whether they realize it or not are not used to seeing stages filled with green light, so to witness not just a moment but a whole number receive this treatment subconsciously pulls them out of the already theatricalized world of the play and reminds us that what the characters are experiencing is an altered state of reality. The design choice also utilizes elements of a surrealist style, as it is inherently reflecting the mental states of the characters, rather than the state of the world.

Conventions exist in all aspects of theatre, and no matter what genre or style you are designing there will have been previous works that you can look to for those conventions. However, it is important to remember that these conventions are guidelines, a set of loose rules meant to inform, but not dictate, a designer’s decisions. When followed, their use can serve as a shortcut to make the audience feel a certain way, as a bright stage comes with certain expectations that a dimly lit stage does not. But what can be more impactful in a design is when these conventions are broken. Breaking a convention subverts the expectations that an audience

brought with them into the theatre, forcing them to question their predisposed beliefs and think more critically about what has been presented to them.

One of the simplest conventions of theatrical lighting that exists is that the lights are pointed at the stage while the audience sits in the dark, but even this can be broken for the right reasons. For instance, in a production of *The Royale* by Marco Ramirez and lit by John D. Alexander at the regional theatre TheatreSquared, the final moment of the production sees the audience being filled with a flood of white light. The play, which follows an African American professional boxer in the early 1900s, culminates in his fight against the former heavyweight champion, and as the fight ends the protagonist stands in victory, the audience is blinded by light, pushing them to internally reflect and wonder about their role as viewers being entertained by the violence of the sport. It is such a simple convention to break, yet at the same time it can be so powerful, and as long as the decision is motivated in storytelling then there is no reason why a convention needs to be upheld.

My Own Explorations Into the World of Lighting Design

In my senior year I was able to finally explore the art of lighting design firsthand, as I was recruited to be the lighting designer for the department's February production of *Hedda Gabler*. I had studied light before and had often worked close to it, but this project marked my first time being able to funnel my own creativity through the medium into a fully realized production. For me, working on *Hedda Gabler* was not just a chance to create a good design, it was the experiment through which I could find the answer to my question: how do you design lighting for a play?

The experiment began in August before the fall semester started, as I completed my initial read-throughs of the script and met with the director, Lacy Post, to discuss the creative

direction for our specific production. *Hedda Gabler* is a classic piece of theatre written by the Norwegian playwright Henrik Ibsen in 1890, and therefore it has been produced by an uncountable number of theatres, the majority of which likely took the play into a realistic and period accurate direction. However, Lacy did not want to stick strictly to that norm, and instead wanted to bring the play into the modern day, showcasing how the core parts of the story – those centered around the human experience – are not period specific and exist just as much now as they did 130 years ago. Along with this information Lacy began to introduce me to the idea that lighting could aid the story telling in an almost surrealist fashion by pulling us into the subconscious of the titular character when she is experiencing the loss of control over her own environment.

I took the information that I gathered from this meeting and immediately began researching. First I focused on practical research based in a more realistic style of lighting, and I began to look at how light looks coming in from the outside. I looked at the color temperature of natural light as the time of day shifts. I looked at the quality of light that exists in Norway – the play’s original setting – as well as in Santa Barbara, CA, where Lacy envisioned our production. I looked at how the changing months and seasons alter the natural light we perceive. Then I shifted my research to focus on interior lighting, and the warmth that it tends to provide in its color temperature versus the cooler temperatures of natural light that exist through most of the day. Through these two sections of research I aimed to find a way to create a clash between the two, with my design goal being to use realistic but conflicting lighting to showcase the inner turmoil in Hedda’s mind as she feels trapped in a house that does not feel like her own. I wanted to be able to contribute to that element of storytelling in a subtle way, but one that would still go noticed in the subconscious of the audience and create an underlying sense of tension.

After my initial research I came to realize that much of the work of the lighting designer must wait until other areas of production are farther along. You can begin to imagine what angles or colors you will utilize to execute your design, but until there is a finalized set you cannot create the paperwork needed to begin that execution. So for a few months my involvement in *Hedda Gabler* consisted of attending design meetings and participating in the development of the conversation regarding our visions for the production.

Rebirth: Diving Into Dance

In the period between the creation of my ideas and the beginning of seeing them realized, I was provided another opportunity to do lighting design, one that would have a much quicker turnaround. In the fall semester the University's theatre department hosted *Rebirth*, a dance production that was a product of the work of The Movement, a registered student organization, as well as the dance classes within the theatre department. My involvement in the project consisted of coming in near the end and creating a lighting design for one of the dance pieces within the show, a six minute piece called "Infinince or Infinity".

The process of lighting a play is much different than the process of lighting a dance piece, and even though I had little to no understanding of the specifics of lighting for dance, I knew two fundamental truths. The first of these being that dance lighting can lend itself to far more abstraction, and the second being that there is still a story being told, and your design needs to aid that story just as it does in theatre.

While doing research in preparation for the piece, I stumbled upon a clip from a dance performance called *Caught*, featuring lighting design by Howell Binkley. In the clip there is a sole performer in an otherwise dark and empty stage, and he begins to leap around the space. Binkley utilized a strobe, timed to the peaks of the performer's leaps, to create the illusion that he

was flying through the air. It was a remarkably simple and moving piece – capturing the idea that dance is both abstraction and storytelling – and it served as motivation to create something that could also aid the story that the dancers in my piece would convey.

So, I began to listen to the music and watch the filmed rehearsal to understand the choreography and the movement of the piece, all with the purpose of finding that story and conceptualizing how lighting can help tell it. The creative aspect of this experience was very fulfilling, and I am proud of the design that I created, but I feel that where this project aided me the most was in the technical experience and understanding that it provided me with.

From conception to realization, my involvement took roughly a week, making the whole experience essentially a crash course in how to not only design, but read and utilize a light plot, program with a lighting console, and work in a timely manner during tech rehearsals. A light plot is the first piece of paperwork that a designer creates, and it consists of an architectural plan of the theatre space as well as any scenic design, which the designer then places their lighting fixtures onto to create a plot of where they exist within the space. Since there were multiple designers for *Rebirth*, I had not actually created the plot for my piece and was instead using the general plot for the show, which meant that I had to quickly learn the language of a light plot so that I could not only execute my design ideas, but also know the limitations of what was available. Then, I had to begin programming my cues for the show. I had done light programming before, but it had been years prior and it had also been a much simpler plot, so I was again made to quickly learn the fundamentals of programming the lights themselves. This meant everything from setting levels and selecting colors, to programming moving light fixtures to track a dancer's movement across stage. Finally, once tech began I got to experience how it is to be the lighting designer during a tech rehearsal. Having been in numerous tech rehearsals as a

sound designer I had seen lighting designers work, and I had a good understanding of the fact that tech is where a majority of the work for lighting has to take place. I knew that it takes up the most time during tech out of all areas of the creative team, but actually being the one who is taking up that time put it into a new perspective. In tech I learned how to strike a balance between taking the time I needed to execute a design and working fast so that I am not holding everyone else back. All of these practical lessons about lighting design set the stage for how I would go on to approach *Hedda Gabler*, as I now had a solid foundation of knowledge on which I could operate.

Plot

When I returned to *Hedda Gabler* the scenic design was in a place where I could move on to creating my light plot for the show (Figure 15). Now that I had just experienced working with a complicated plot I better understood what I needed to make mine look like, and so I opened the drafting file that the scenic designer had created and used it to begin placing my fixtures. The first element of light manipulation that I had to consider was the angle of my fixtures, as creating a light plot is all about where the source of light exists in relation to the stage. I knew that my primary acting and scene lights would consist of back and side lighting for sculpting, as well as front light for illumination, and for this front light I decided to go with a method often found in educational environments: the McCandless method. This lighting method, named for its creator Stanley McCandless, is a method for lighting actors in which your front light is composed of two fixtures each 45° off of either side of the front axis. In one side of your front lights you have a warm color such as a pale amber, and then in the other side you have a cool color like a light blue, which when used in combination create the illusion of a directional

source of light (the warm color) and a perceived shadow (the cool color) while keeping the face illuminated from all sides.

Immediately upon seeing the renderings for the scenic design, which featured a large glass door leading to an outdoor patio, I knew that I wanted to put time into creating a sense of the exterior world through light. I plotted out where different specials could go that would shine into the set from backstage areas, creating the appearance of the sunlight shining in through the windows in the office space and hallway, and most prominently through the patio door. With these lights I was staying in the world of realism, but with a heightened focus on creating picturesque and beautiful scenes. I made sure to match their angles relative to the windows in order to make all the lights appear as though they are coming from one sun, and though I originally intended on hanging multiple lights for each window all at different angles to convey different times of day, I ended up moving away from that approach. This was one of the first major lessons I learned about the artistry of lighting during this process, as I realized that you do not need to make everything exactly how it would look in reality in order to convey that reality. Yes, having multiple angles from which the “sun” could shine through the windows would be more realistic, but simply having one set of angles and instead varying things like color is enough to convince the audience of a shift in time.

The last important element to note about my utilization of angle in the plot was through the hanging of fixtures at various heights in the cove positions on either side of the stage – which I would later be able to utilize as I saw fit – as well as the addition of moving light fixtures evenly spread around the stage to act as a fail safe if I later realized I had not left myself with enough light to work with in certain areas of the stage. These lights, while not incorporated into my initial plans, came into play later in the process as we got closer to tech. It was through this

that I learned that if you have the resources to do so you should hang more lighting fixtures than you think you will need, because you will not want to find yourself short on possibilities when the creative work begins. When researching I found this same sentiment expressed by Tharron Musser – a respected figure in lighting design – in a panel discussion she participated in for the 1989 Broadway Lighting Seminar:

I really study when I hang a light pipe on the drawing board, what those lights are going to do, what they're for. I go through the script, what I need here, there, and there and there that is specific, that I know. Then you add a little extra where you have space to cover yourself. You have a reason for everything you put there and then cover yourself a little, but I don't mean cover yourself with 20 light pipes. Do your homework, have a reason.

The next element of artistry that I had to consider was color, because when using incandescent fixtures you need to notate on the light plot what gels will be used to give the production team time to locate or purchase what is necessary. For the most part I was utilizing our LED fixtures as much as I could, because that would give me the freedom to choose and change color as I saw fit later on during tech, but there were plenty of fixtures that did need colors picked ahead of time. For the most part these fixtures were my front lights, as well as some of the specials I had placed for scenic elements such as door frames and seating areas, and for these lights I stuck to either pale gel choices or no color at all. This is because I knew that the majority of the play existed in a realistic world, and any moments that moved away from that style would be better suited for my LED fixtures.

Color played a role in my design in two primary ways, the first of which was establishing the world details of the scene at hand. For instance, the play's opening scene takes place in the

morning, so I used my LED “sun” lights in a color temperature of white around 5500K in order to represent a true tone of white like one would see in the morning or during the day. Then, the next scene took place during the evening before sunset, so I shifted the lights coming from outside into a warmer, “golden hour” look (Figure 16). After that was our intermission, and knowing that the second act would begin the morning after the previous scene I decided to light the set as if it was night time, shifting the lights into a “moonlight” look, which was a slightly theatricalized blue light (Figure 17).

The other main use I had for color was when the play entered its more abstract moments, of which one stands out in particular: the burning of a manuscript at the end of the third scene. This moment in the play is a climactic scene where Hedda makes the decision to burn the manuscript of her husband’s competition, an action she equates to burning a child, and the power of the scene called for a lighting event. In the scene she walks over to the patio’s fireplace and throws it in paper by paper, before ultimately tossing in the whole thing, and it felt like a perfect moment to make the fire grow to an excessive amount. The “fire” in the fireplace was a combination of flickering bulbs of orange and yellow light, a fog machine, and a light hidden in the fireplace to create a fire that can be both smoldering or engulfed in flames. In the moment the fire began to grow and then, once she threw the full manuscript, all the lights on stage went out except for the fire and my exterior lights, which I shifted to a deep orange with an added flickering effect (Figure 18). It was not a realistic look, but it was right for the moment and a powerful visual. It also taught me an important lesson about color which was that sometimes it should be saved solely for the moments in which it can have the biggest impact. If you create a world where color largely mimics reality, then it makes the moments when you break away from that convention all the more impactful on the audience.

Focus

Once my plot was complete and the fixtures were hung in place, it was time to move on to focus. Focus is the point where a lighting designer goes into the space and looks through their plot fixture by fixture, turning each one on individually to make sure it is pointed in the right place. It is also the time when a designer can truly get a feel for the shape of the beam, and further manipulate it through the use of shutters and gobos. Much of the shaping I did was for practical reasons like cutting the edge of the beam to the wall edges of the set in order to blend it naturally, or cutting to the inside of a door frame so there was not too much light bleed. This is because oftentimes the goal of lighting design is to go unnoticed by creating a look that is natural and smooth enough that it just feels right to the audience and does not look like a series of overlapping spots. However, there were still times where I intentionally used the shape of the beam to create visual texture and interest, the vast majority of which took the form of light interacting with the real or implied architecture such as windows. For instance, one of my sun specials was shining through a physical window located in the office upstage, and therefore you could see the grid that the window frame created on the floor of the set. However the sun special that shined in the hallway had no window to interact with, so I placed a gobo in the light to fake architecture that was never there, filling out the rest of the house in the audience's imagination. I also utilized window-shaped gobos coming from the balcony above the audience to add an additional level of texture on the stage, as well as a window gobo in one of my moving lights.

That moving window gobo was one of my favorite lights within my whole design, and all because of the way I utilized it in one transition moment. It was the moment between the first two scenes when the play moves from the morning to later that evening, and I had been trying to think of ways to fill the moment with light – because there was a complicated quick change that

needed to happen backstage – when my mentor suggested creating a cue that moves the position of that window higher onto the wall, mimicking the setting of the sun to show the passage of time. The idea was perfect, and so before the next day of tech I spent time in the theatre to work on building it. In combination with the fade from a cool to a warm color temperature of light, the movement of the light fully sold the idea that time was passing, and it had the secondary purpose of filling what would otherwise be a static and lengthy transition with life, keeping the momentum of the show going. It was through this moment that I learned my next two lessons about lighting design. The first of these relates to my earlier realization that not everything has to follow realism, and it comes down to the idea that putting extra effort into one aspect of a look can distract from areas that may not follow the rules you have set. By utilizing the moving light to show the angle of the sun changing, I pulled enough of the audience’s attention so that they would not notice the fact that all the other light coming from the “sun” was actually remaining stationary, and only changing in color. It hid the shortcut that I took without taking anything away from the design.

The other lesson this taught me has more to do with the discipline of theatre itself rather than specifically lighting design, and it is the idea that your design does not have to be composed entirely of work that originated in your head. Theatre is a collaborative art, it is why there are creative teams that work with a director to execute a vision. As a designer you can and should bring your own interpretations and creative ideas to the table, but you should not be set in the idea that your method is the only method because you will close yourself off to the input of your team. Sometimes the best idea or solution comes from someone other than you, and a good designer will take that suggestion and work it into their own design. I had been struggling to find a solution for that transition, and if I had refused to take external input then the moment would

have not seen its full potential. Collaboration is a vital part of the work that we as theatrical designers do, and sometimes it is important to remind yourself of that.

Programming

All of my lighting fixtures were now focused into my intended positions, and that meant I was finally able to begin creating looks and programming the show. When constructing a scene one still is actively thinking about angle, color and shape, but this is the point in the process where intensity really becomes a key factor. Lighting design is not as simple as just turning on the fixture you want on and turning off the ones you do not, and the ability to control the intensity of the beam is what allows for such a control of the medium. In general intensity is used not as an element of storytelling but rather as an element of creating intentional and appealing looks. A light that is too bright will wash out any detail in the form of an actor or set piece, but a light that is too dim will cause dark spots that keep the audience from seeing what they need to, so it is important to hone in the intensity of all of your lights in order to create a good balance.

That being said, there are still plenty of times in which intensity becomes an element of the storytelling, and even further there can be times where it takes center stage. The primary method by which intensity accomplishes this is by the deliberate use of contrasting levels of brightness in order to draw the audience's eyes towards what you want them to see. In a production with a large set, such as *Hedda Gabler*, you do not want to illuminate the entire space with the same level of light. Instead you want to actively illuminate only what is important, keeping other areas dimmer so as to not distract the audience. I did this in the show several times when the actors would settle in spots like the seating area or the patio for extended periods of time by using long fades to subtly alter intensity and draw attention towards the brighter areas where the action was actively happening. This principle is what a significant portion of my cues

involved, but not all of my work with intensity was meant to be subtle. For instance, there are several moments in the show that our director considered to be cracks in Hedda's mindstate, pushing her further and further towards her breaking point, and in these moments lighting and sound could be heavily utilized to give the audience a peek into Hedda's mind. When first thinking of how to accomplish this with lighting I considered the use of different colored spotlights for each of the moments, but I came to the decision that using color felt like the wrong choice for these moments. Instead, I thought that a better way to showcase her deterioration would be through variations in lighting intensity. For these moments – of which there were three, each growing to be larger than the one before – I used my moving lights to place a tight overhead spot on the performer playing Hedda in a bright white light, while simultaneously dimming the world around her (Figure 19). Each time the contrast between the bright and dim areas got more and more intense, and it ended up being a successful approach to representing inner turmoil.

Tech Week

Shortly after my programming time began we moved into tech week, where all the elements of design and production come together in the rehearsal environment and put together the final show. Due to my experience in the dance show from the previous semester – as well as my time involved in other techs as the sound designer – I had somewhat of an idea of what to expect going into this part of the process for *Hedda Gabler*. However, the main difference was the amount of time that I had to work with for the full length play as opposed to the six minute song. I learned that dance is something that comes together very quickly, where I could really only spend a few hours maximum working with the dancers present, and therefore the week of rehearsals that were scheduled for *Hedda Gabler* gave me a sense of security that I would have the freedom to spend more time with what I felt needed it.

Overall the process of tech went smoothly, being in the room with everyone allowed me to discuss ideas with the director and other designers as they came to me. It may be a more time sensitive working environment than the preprogramming you do before tech begins, but I prefer the collaborative spirit that it invites as opposed to sitting alone at the board and having to serve as both artist and critic. When everyone is in the room together you can get instant feedback on whether what you are trying is actually working or not. For instance both the director and I were having trouble imagining what the final image of the play would be. It ends in such a shocking and powerful way, with Hedda ending her life just out of view and the rest of the characters present looking over her body, and it felt like it called for some sort of lingering light that would force the audience to reflect. So, the first thing I tried was a fade to black over the course of eight seconds, and it was absolutely the wrong decision. Having the actors in position in that moment, standing still for eight long seconds, felt far too awkward and the room was in agreement. So over the course of that tech and the next I continued to think, build new cues, and try them out until we found the result that worked best. Rather than fading everything else out at once I created a fade that swept across the stage, creating a growing darkness from left to right that briefly lingered over the hallway door that they were crowded around before finally cutting to black. It added movement to a stagnant tableau and pulled the audience's attention directly where it needed to be to spark the reflection that Lacy wanted.

Strike

There was one final lesson that I learned over the course of my deep dive into lighting design, and it is a fairly simple one: avoid over-designing at all costs. It cannot be stressed enough that theatre, at its core, is about storytelling, it is not about what we do as lighting designers, or the garments that a costume designer creates, or the ambiance that sound designer

sets, it is about the playwright's story. Our primary goal is to tell the story, and because we want to tell that story in a beautiful and inspiring manner it can sometimes be easy to lose the plot for the picture. I first felt this when I was designing for *Rebirth*, as my original thoughts as I was watching the video left me with around 50 cues in a six minute piece. In retrospect I can almost laugh at my original ambition, as that density of cues is simply too much for what the piece was. Fortunately I had already made that realization in the pre-programming stage, and cut the more superfluous and unnecessary cues. As I have said, I am proud of my work on *Rebirth*, but I can acknowledge that even after my cutbacks it was beginning to lean into overdesigned territory, and now I have a new perspective on it that I can bring with me to any future dance lighting I have the opportunity to do. Sometimes in dance you can use lighting to tell the stories in ways that you never could without it, like was the case in Binkley's dance piece. But more often than not you need to just create a beautiful look and leave the rest to the performers because they are what the audience came to see in the first place.

When watching the designer run through for *Hedda Gabler* before the start of tech, I started to do a similar approach, marking around 70 areas where I thought there could be a cue. Now, this was for a roughly two hour show as opposed to a six minute song, but when you are producing a realistic play – or at least one that lies mostly in realism – it is not uncommon for you to set the lights at the beginning of a scene and not change them until the next scene. So, taking what I learned from *Rebirth* I entered my pre-programming knowing that some of these cues would not make it through, and that that would be more than okay. I left my lighting events for the moments that called for them most, which not only kept the emphasis on Ibsen's story, but also made the moments where I did allow lighting to take a more dynamic role all the more powerful.

Conclusion

There are rules that exist in theatrical lighting, but if everyone were to follow those rules to a T then there would be no need for a designer at all. Any director producing a show would simply input what genre and style their production was using and follow the checklist on where to put lights and what to turn on when. Clearly this is not the case, and this is because a designer has a far more valuable role than being able to recreate what those before them have done. A designer's role is to know the rules of the theatre in order to know when to act within them and when to break away from them. A lighting designer should take their understanding of all aspects of their craft and apply only what is important to aid the current production at hand. A period production of *Hamlet* would not look right if it was illuminated with a *Hamilton* style light show, but a production of *Wicked* would lose its charm if it traded in its lighting spectacle for the light plot of a small theatre's production of *Death of a Salesman*.

Being able to spend so much time thoroughly exploring lighting design has stoked the fire that *Wait Until Dark* lit. I feel that it is such a powerful tool in the theatre, and knowing how to wield it can allow you to create such beautiful images on stage. In researching for this paper, I found a quote from a 2015 Live Design interview with Howell Binkley that captures what I now feel about the art of lighting design. Yes you need to follow the script, and yes you need to create for the production, but, as Binkley said "I truly believe that if a lighting designer is able to sculpt a piece with passion, imagination, and a limited amount of technology, the world will open to her or him".

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Appendix

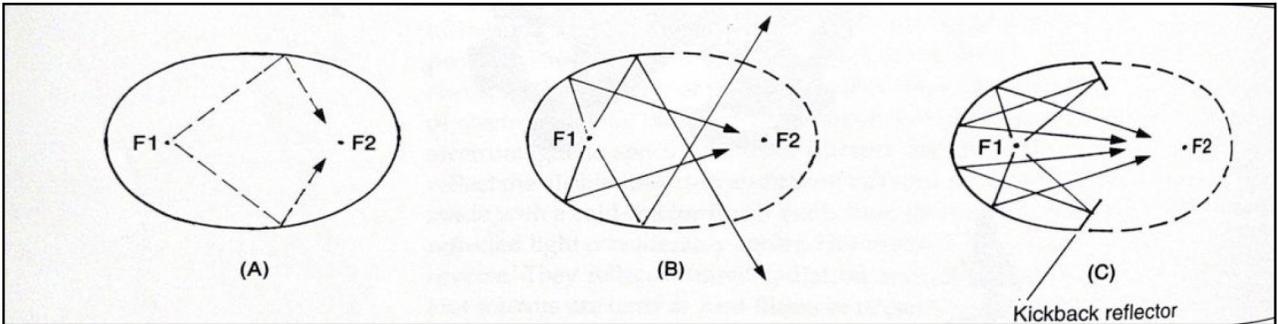


Figure 1 - A diagram of the path of light produced at F1 in an ellipsoidal reflector when that reflector is whole (A), when the front half is removed (B), and when kickback reflectors are added to the half reflector (C) (*Theatrical Design and Production - Fourth Edition* by J. Michael Gillette, Page 342)

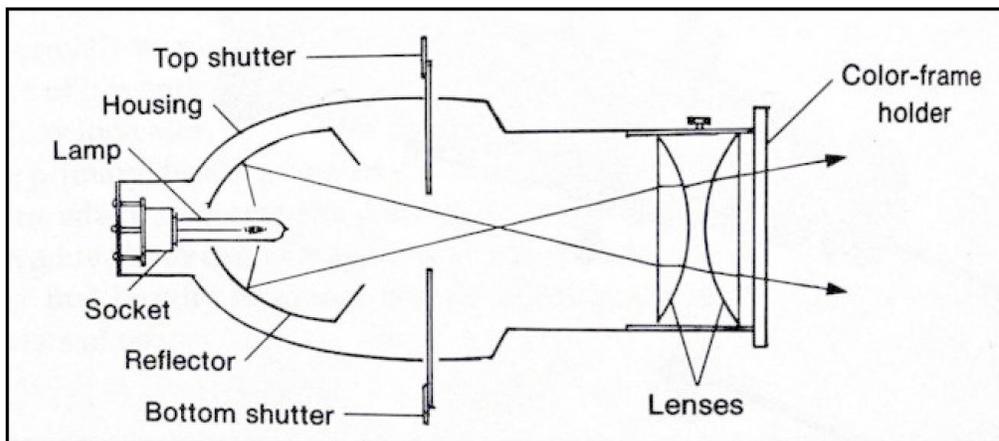


Figure 2 - The internal mechanisms of an ellipsoidal reflector spotlight (*Theatrical Design and Production - Fourth Edition* by J. Michael Gillette, Page 342)

Beam / Field Angles for Typical ERS's*			
<i>Instrument Type</i>	<i>Beam Angle</i>	<i>Field Angle</i>	<i>Maximum Effective Range[†]</i>
6 × 9	16°	37°	35 feet
6 × 12	11°	26°	50 feet
6 × 16	9°	18°	60 feet
20°	10°	20°	70 feet
30°	12°	30°	60 feet
40°	15°	40°	55 feet

*All data are approximate but typical. Specific data varies with manufacturer.
[†]Determined by point at which output diminishes to 50 footcandles.

Figure 3 - A table listing the type of instrument alongside their respective beam angles, field angles and maximum effective ranges. (*Theatrical Design and Production - Fourth Edition* by J. Michael Gillette, Page 344)

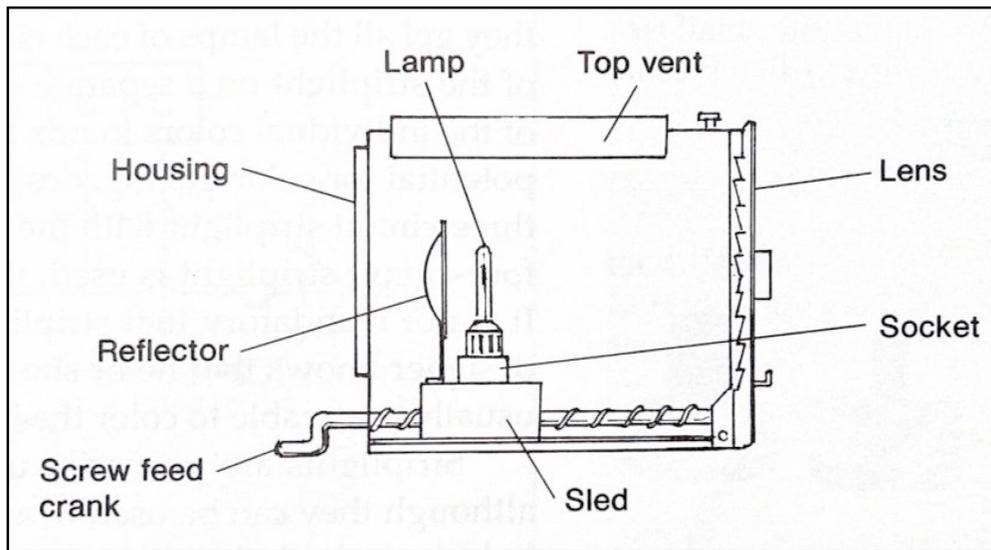


Figure 4 - The internal mechanisms of a Fresnel spotlight (*Theatrical Design and Production - Fourth Edition* by J. Michael Gillette, Page 347)

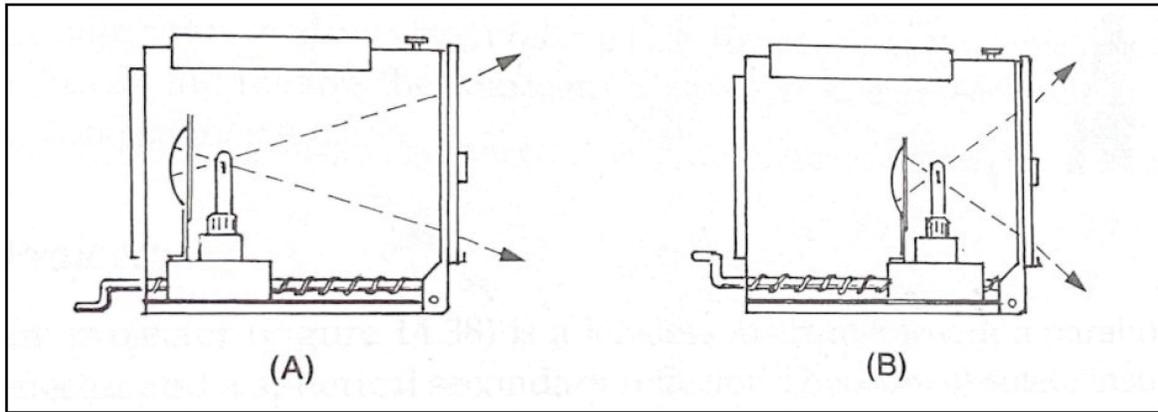


Figure 5 - Diagram of a Fresnel Spotlight and the path the light beam takes when the lamp is located at the back of the instrument (A) and at the front of the instrument (B). (*Theatrical Design and Production - Fourth Edition* by J. Michael Gillette, Page 347)



Figure 6 - Images of a PAR 64 can light (A) and an ETC Source Four PAR light (B) (*Theatrical Design and Production - Fourth Edition* by J. Michael Gillette, Page 350)



Figure 7 - Scene lit with only front lighting.



Figure 8 - Scene lit with only back lighting.



Figure 9 - Scene lit with only side lighting coming from the right (stage left).



Figure 10 - Scene lit with only side lighting coming from the left (stage right).



Figure 11 - Scene lit entirely in the color red.



Figure 12 - Scene lit entirely in the color blue.



Figure 13 - Scene lit entirely in the color green.

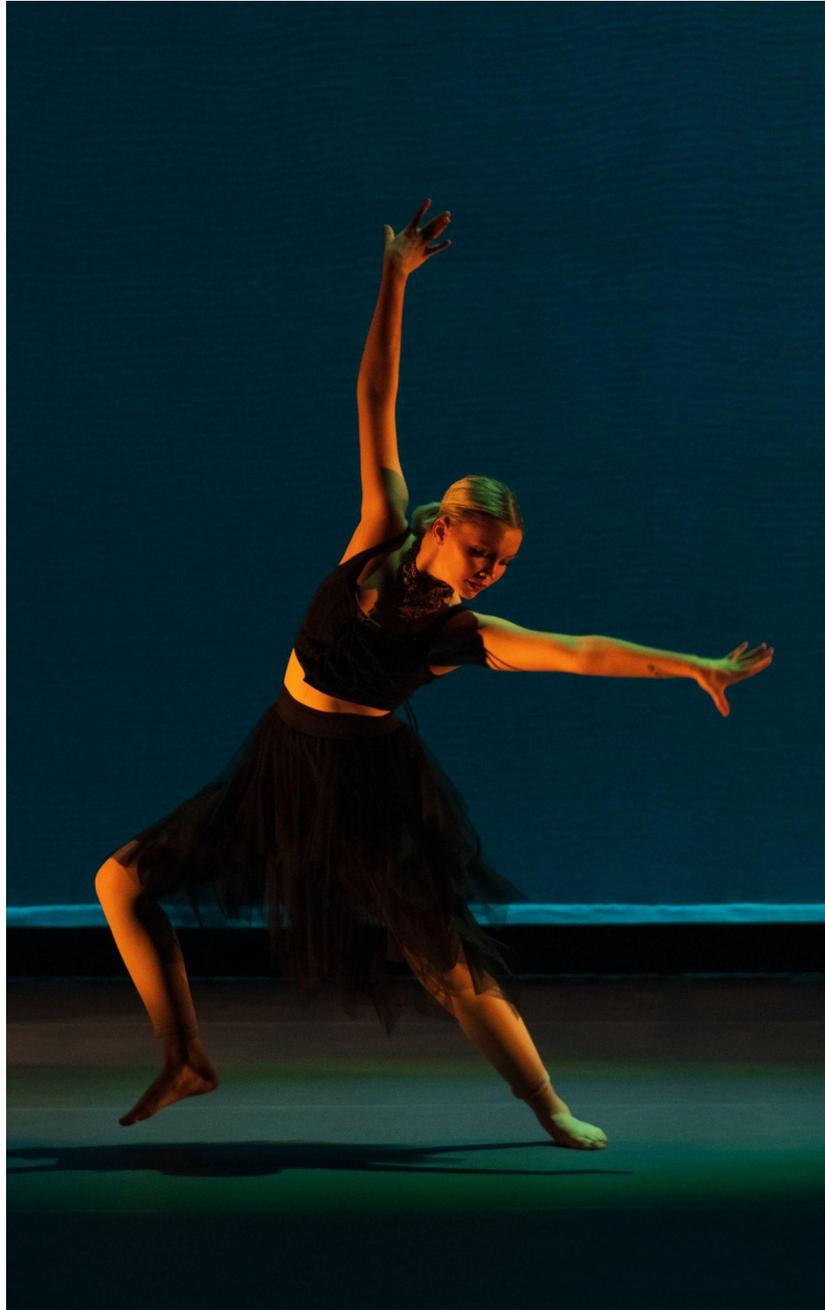


Figure 14 - Photo of one of the performers in the piece “Infinince or Infinity” that I designed for the dance show *Rebirth*.

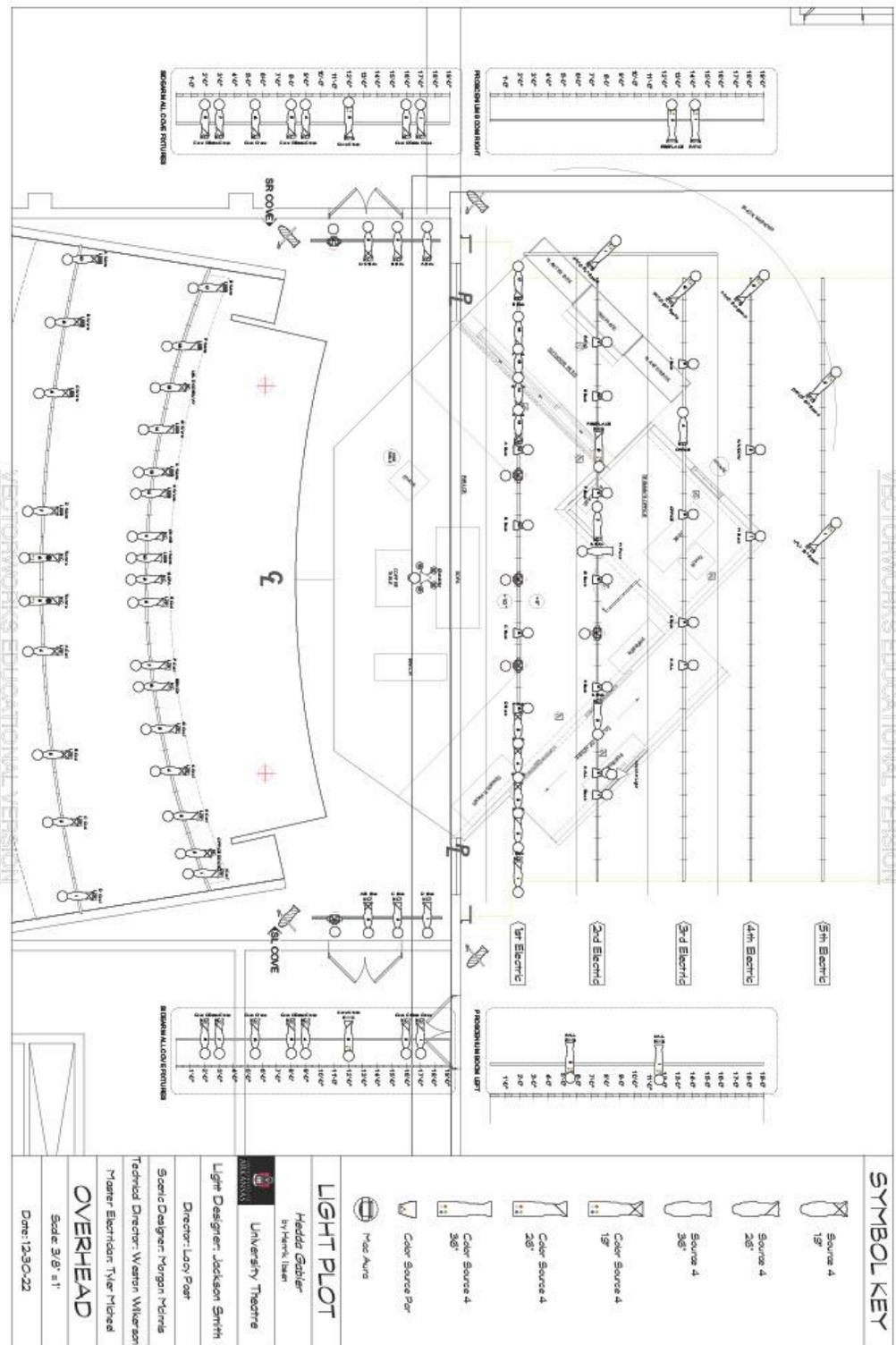


Figure 15 - The final iteration of the light plot for *Hedda Gabler*.



Figure 16 - Photo of *Hedda Gabler* showing a scene during the “early evening” look.



Figure 17 - Full stage photo showing the intermission's "night" look.



Figure 18 - Photo showing the moment in *Hedda Gabler* after Hedda burns the manuscript, when the light from the fire engulfs the stage.



Figure 19 - The moment in *Hedda Gabler* where Hedda experiences her final “breaking point” and the lights pull all the focus onto her.