The Use of Light in the Designed Environment

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by
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ABSTRACT

Light plays a major role in our lives in many different ways. Unlike past generations, we no longer live from dawn to dusk only by the light of the sun. Society today is one of constant activity no matter what time of day or night. Despite these trends, landscape architects have failed to use light to enhance the design of the spaces they have created. This creates a need to design spaces that are functional and aesthetically pleasing during the day as well as the night. This project investigated and created a link between both natural and artificial light and a designed environment.
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Light in Everyday Life

Light gives rise to vision. Because there is light, we can see the natural and built environment in which we live. The majority of light that is produced comes from natural sources. The sun provides the most obvious form of natural light. It illuminates the earth from the time it rises, until the time it sets. The duration of the sunshine is dependent on the season though. During the winter, daylight is short while the night is long. During the summer just the opposite is true. While the sun is shining on the other half of the earth, sources such as the stars or the reflection off the moon illuminate the earth. They can only produce a fraction of the light the sun produces, leaving the world in a darker state. Light, and the lack of it, plays a very important role in the lives everything that lives on the planet. Basic functions of life depend on light such as photosynthesis and evaporation. Society also depends on light contributing to everyday interaction. We cannot function without light.
**Introduction**

*Light in perception, feeling and definition of space and form.*

The fact that light allows us to see the environment in which we live is obvious. Light also contributes to life on this planet in a possibly more important manner. Light changes our aesthetic perception of the world in which we live. For example, the French Impressionist Claude Monet did a series of very famous paintings of haystacks. Each painting is simply a haystack in a field. The real brilliance of these paintings is that each is a study in how light changes the appearance of the haystack. Each haystack appears slightly different because of the conditions of the light in which it is viewed. The different conditions of the light change the visual aesthetics of the haystacks so that each painting is a completely different work.

Closely associated with the aesthetics that light creates, is the feelings that light helps to evoke. Take for example again Claude Monet’s paintings of haystacks. Changes in the light are used to evoke different emotions. These changes evoke an emotion based upon the colors and the intensities of the light. A very intense yellow light on the haystack creates a feeling of warmth and happiness. Conversely, a pale blue-gray light creates a feeling of cold sadness. A candle is another example of how light can create a feeling. In different settings, the warm personal glow that is produced by that candle evokes certain emotions. If that candle were in a church, one would feel a sense of sacredness. If that candle were on a table with a bottle of wine a feeling of romance would be created.
If different feelings are evoked depending on the setting in which the light is located, light must also help to define location. Several small tables each with a candle, would evoke a romantic feeling. This leads to the conclusion that you must be in a space designed for a personal conversation, maybe over a meal, between two people who know each other very well. The space may be a fine restaurant or an up-scale dance hall. If the light in this same space however was changed to a pulsating display of colors there would be little doubt that you were in a night-club. Think also where you might go to see an elaborate display of neon lighting used in signs. An image of Las Vegas probably came immediately to mind.

Light is a factor in our environment that contributes much more than sight. Light allows us to perceive, to feel and to define the space or form in which we interact with. Each of these factors contribute differently to the experience we have in the environment. By altering the lighting conditions, perception, feeling and location can be altered creating a new environment.
BACKGROUND

Literature regarding lighting is not that easily found especially when specifically dealing with lighting by Landscape Architects. I have thus drawn on a variety of different sources in my search. Thus far, I have reviewed literature that can be placed into three basic categories. The first area of research deals simply with the scientific definitions of light. Light is an intangible element that we as a society have tried to classify. To better understand the entire nature of light different classifications are studied as well as biological mechanisms for receiving light. The second area that I have found literature on is a more pictorial reference of works involving the use of light. These books have very little on the techniques that actually go into producing exterior illumination, but are an excellent visual reference as to what can be done with light. The final area of research deals with actual lighting techniques. These sources include the works that are written about landscape architectural lighting, as well as stage lighting, and architectural lighting.
What is Light?

Light should first be defined so that we have a greater understanding of the problem's roots. What is light and how is it measured? Light is a very abstract idea. Each of us is going to perceive light a little different because of physical and psychological variations. Therefore the best definition so far is precise yet inaccurate. We can accurately describe light as radiation on a scale, yet this does not alone define light. These is a need to define light as to human perception. Light is described in photometric and colorometric properties. These properties, to be described later, are an attempt to tangibly quantify the intangible properties of light. Because of this complexity, the definition of light is inaccurate and often ambiguous.

Accurately, light can be defined as electro-magnetic radiation. Visible light is a small fraction of the electro-magnetic spectrum located between bands of ultra-violet light and infrared light. Visible light has wavelengths between 380x10^-9 meters and 760x10^-9 which is a small portion of the entire spectrum which ranges from 10^-15 meters to 10^4 meters. These wavelengths are not visible to humans and include gamma rays, radio waves and infrared light just to name a few.
Within the range of visible light, the wide variety of wavelength and radiance produce different visual effects. According to sources, visual effect is the primary principle used in the measurement of human sensitivity to the spectrum and perception. Human judgement is the yardstick by which we measure lighting qualities. The first description of light does not take into consideration color. This constitutes the photometric description of light. The starting point for visual effects, in which color is not a factor, is a function of wavelength and radiance. Two equal fields with the same wavelength and radiance will appear the same or have the same visual effect. Alter the radiance of the fields while keeping the wavelength the same, the field with the higher radiance will appear brighter. Radiance can therefore be explained simply as brightness of a monochromatic light source.

The radiance attributes of light do not take into account the different combinations of wavelengths. These different wavelengths can have the same radiance, but it is the difference in wavelengths that cause color. This is the colorometric description of light. Different colors depend on where the light is located on the spectrum. If the wavelength is on the long end of the electromagnetic spectrum, it will be red. If the wavelengths are near the short end of the spectrum they will appear blue. Yellow is produced by wavelengths nearest the middle of the spectrum. All the other colors are gradations and mixtures along the spectrum. The gradations from the first important principle of color, hue. Hue is the tendency of a color to be blue, yellow, orange, red or one of the many other colors. The second principle of color is the degree of lightness or darkness of the color. The third is the chroma or colorfulness of the color.
These three attributes allow us to classify perception of nonluminous surfaces in terms of color during the daytime. Color perception at night, however, follows altered guidelines that derive from these attributes. During the night-time color has a tendency to vanish or at least become distorted on non-luminous surfaces. The reasons why this is so will later be discussed, but the brightness of light plays a greater role in the perception of the night-time environment.

That is not to say that color is not important, because it should be important. We are able to perceive our world quite well in black and white. Photographs taken in black and white are often no less revealing than color photographs, but how many of us still take pictures in black and white. Color must then help to evoke moods and human responses to certain situations. Red for example is the color of rage and triggers a response in the nervous system speeding up the heart and respiratory rates. Soft colors conversely foster intellectual growth and peacefulness. Cultural associations are also linked to color. Black to westerners is a sign of evil and void. Black magic and witchcraft are associated with the color black for that reason. However in eastern thought, white is associated with these same attributes, because to these people white is an absence of life.

Light must therefore be discussed in two ways, radiance and color. The more important one appearing to be radiance. Enhancement of the night-time environment can easily be achieved from the contrast in brightness of lighting fixtures. However, this neglects a major part of the definition of light and that is color. The full appreciation of light can then be achieved through the use of luminous sources that produce color. Both help to make up the definition of light and both should be used to enhance the environment.
**The Eye**

How humans actually see complicates our understanding of light and how it will be used to enhance the environment. As it has been previously mentioned, human perception of color is altered during the night. The eye is composed of very complicated systems of muscles, lenses and nerves. The eye must first be turned perpendicular or as close as possible, to the focus of attention. This is accomplished by a series of opposing muscles. Next, light passes through the cornea of the eye. The amount of light let in is controlled by the iris (the colored part of the eye). The light passes through an opening, the pupil, or dark part of the eye, to the lens. The lens can vary in focal length by changing its shape and focusing the light on the retina. The retina is filled with rods and cones which is the photochemical surface upon which the image is begun to be processed. There are two layers of cells that provide interconnections between the photo receptors (rods and cones) and the nerve fibers. It is the rods and cones which are the source of the differences in day and night color perception. These photoceptors are unevenly distributed on the retina. However, this does not account for the differences in perception. Each is sensitive to different wavelengths of light. Peak sensitivity for cones is about 555x10^-9 whereas the peak sensitivity for rods is 505x10^-9. It can be broadly said that cones operate during the daytime and rods the night-time. This is because the different sensitivity to wavelength. Thus during the daytime, we are better able to see color than we are during the night.
Visual References

The first type of pictorial literature which was researched was about light in art. These include paintings, photography, sculpture and other various works of art. The importance of looking at these pictures has been two fold. By first looking at an artist’s impression of light I have realized that light has a dramatic impact on the way in which we perceive space and form. Secondly, these sources have increased an appreciation for how light can be used in a creative manner to improve the aesthetics of an area.
Natural Qualities of Light

I have used photographs and paintings of the landscape to better understand the natural qualities of light. By splitting these into the four seasons I have been able to understand how light is different through the year. Winter light is a pale cool light due to the shortness of the days and the low angle of the sun, while summer light is warm and vivid because of long days and high sun angle. Natural qualities of light are varied as to the season of the year. Light in nature is a cyclic process that is never the same. Patterns emerge, but the natural quality of light is a dynamic, ever changing process. Just as applied lighting can influence space and form so can natural lighting. The major difference being that natural light is always creating a new scene as it cycles through the day, month, and year.
**Applied Quality of Light**

Applied light can be thought of in two ways. The first is the manipulation of the light itself. When artists and designers use light in this manner they often create a dramatic effect with the light. No regard to the environment is made, the light is simply allowed to be the expression.
Light can also be manipulated in a more natural setting. This second way of apply light also allows the light to be the focus of the design, yet a more careful attention to the space and form that contact the light is needed.
Light's Influence on Space and Form

There are many principles of lighting that must be considered when attempting to enhance the appearance of the any environment. Light has an distinct influence on the perception of space and form. Scenes of the same image when viewed in different colors, intensities and positions describe the image in completely different manners. This book placed an emphasis on the aesthetics of lighting. Light can strengthen a design concept. The overall design is therefore strengthened also. Light always travels in a straight line from the source. Light strikes the surfaces that are on the path of the line, illuminating them while creating shadow on the opposite side. The surfaces that the light does strike, reflects some of the light, scattering it in many directions. These principles change the visual perception of a space or form by altering the position of the source different effects can be achieved.
SIGNIFICANCE

The use of light can really help to enhance the experience that one has in a space. Light can influence the total experience of a place. By changing the light, new discoveries can be made about the environment, a space or a form. Light can make a good day even better by simply influencing peoples attitude. I hope to achieve a further understanding of lighting issues so that in my future professional career I can expound upon my base of knowledge. Slowly I hope that a conscious effort will be made by Landscape Architects to better use light in their designs.
THE PROBLEM

One of many subjects that Landscape Architects study is environmental systems and their relation to people. Environmental systems are altered by forces. These changes effect the system as a whole as well as peoples relationship with the system. Wind, water, and fire are all forces that change environmental systems. Light can also be included as a force that creates such a change in environmental systems. Light definitely has an impact on people's relationship with the environment. It's contribution to the perception, emotion and location in the environment are understood. Light is therefore an environmental system that alters peoples relation to the environment. Thus, Landscape Architects have an obligation to use light in their designs. However, I believe that the use of light has been over looked as a design element to our profession.
Other designers try to work with light in order to use it to enhance the space or form they create. Artists use light to evoke emotion in their work, Architects use light to illuminate the exteriors of their buildings, Interior Designers use light to enhance indoor spaces. While not all of these designers in the above mentioned professions have used light in their creations, as a whole, these professions have paid far greater attention to the use of light than landscape architects. **Landscape architects can use light to enhance the experience of a designed environment by incorporating lighting design issues from the very beginning phases of a project.**
Other Issues in Lighting

In many ways, I can see why Landscape Architects have often ignored lighting. There are many issues that are associated with lighting that cause the use of light in design to be difficult. When design issues in lighting are addressed, they are all too often treated in a generic manner. Each one of these issues alone could be considered a design problem. Just because a subject is difficult, there is no reason for avoidance. Landscape architects should strive to solve tough problems. These secondary problems that arise in lighting design are: Security: Efficiency: Light Pollution.

A major concern that is always the first to surface is security. If lighting is required then the space must be used by people at night. Unfortunately in society today, crimes do happen some of which take place during the night. Proper lighting techniques can insure some degree of safety in a night-time space.

A second problem with lighting the night-time environment is the operating costs that the lights create. Lighting fixtures themselves cost money as does the hardware to install and maintain the fixtures. The everyday use of the lighting units is a cost because electricity is necessary to power the fixture. The economic value of lighting can be a benefit, however, in that lighting can increase the use of a space leading to an increase in visibility. Increased visibility leads to an increase awareness and sales of a company while decreasing vandalism and theft. Operating costs can also be minimized by choosing low-wattage fixtures and bulbs that are energy efficient. Despite the benefits to lighting, they require a large up front purchase, a constant supply of power and periodic maintenance.
SUBPROBLEMS

Yet another problem is the issue of light pollution. When spaces are light in conventional manners excess light is produced. The light goes where it is intended, but the excess is often scattered into unwanted areas. Think of a city. The light that is produced lights the public spaces but also scatters and travels for miles. This scattering of light is why you can sometimes see downtown Chicago from 60 miles away or why observatories are seldom built in cities. In an example of smaller scale, large department stores light their parking lots so that those who choose to shop at night can see to park their car. This treatment of lighting leads to the placement of stores on the remote fringes of a town or worse in constant dispute with those in the surrounding area who must put up with the nuisance of the lights.
LIMITATIONS

Focusing the Scope of the Problem

The enhancement of a spacial experience with the use of lighting is the main problem I hope to further resolve. For the purpose of this project, limits must be placed in order to keep the focus on the problem at hand. Topics related to lighting that are too broad will be narrowed by limiting their nature so that enhancement of a night-time gathering space can be more fully developed.

Security and crime prevention in the designed space will be an issue. There is a perception in society today that all crimes happen at night, when we know this is not true. Security cannot be guaranteed any time of the day as crime does take place during daylight hours. People assume that a well lit space will be more secure at night and it often does, however, lighting alone does not add to the feeling of security. Other factors like the location and the number of people in the space contribute to a feeling of security. There are criteria in which to use light to make a more secure night-time space, however, the use of light alone does not add to a feeling of security.

This project's final design will address issues of security, but creating a feeling of total security is a separate problem.

This project will not be a study of the efficiency of lighting fixtures. A great deal of technical knowledge is required about electrical engineering in order to calculate system efficiencies. This is knowledge that I do not have, nor do I think I can acquire through reading and self-teaching.

In the final project the overall efficiency of the lighting system will not be addressed.
The client for my project is Ball State University. Currently there are studies being done on the site by Ball State's Campus Development Committee. These studies have been commissioned to come up with a redesign for the University Plaza. The plaza as it stands now is very barren and dull. Because of the future development that is going to take place across McKinley Avenue, the Development Committee wants to plan for a space that is vibrant and full of energy. A pedestrian friendly, vibrant plaza that is full of interest can help in recreating a new campus center that can be used by all students, faculty, staff, alumni, and the community as a whole.
The site chosen for this project is on the campus of Ball State University in Muncie Indiana. Muncie is located approximately sixty miles to the north of Indianapolis off of Interstate 69. Muncie, the county seat of Delaware County, is a large industrial town of about 75,000 people. Ball State University is one mile to the northwest of the downtown area and boasts an enrollment of 20,000 students both full and part time. The campus is 350 acres and resembles a backwards L shape. The southern part of campus is the older half as the buildings are laid out in a more classic style that forms a quad. Buildings there date back to the founding of the University in 1918 by the Ball brothers. The northern half of the site is oriented on an axis along McKinley Avenue. The site for this study is a plaza located in the middle of the newer half of campus. The plaza is bordered on the west by McKinley Avenue and on the east by Pruis Hall. Bracken Library is the northern boundary and University Theater is the southern border. The buildings enclose the space so that a large yet contained plaza is formed.
For this site the client expressed a concern for designed elements that must be incorporated. Of course designs are not limited to only these elements, but these must be incorporated into the space by the request of the University Development Committee.

First, the client wanted to assure the space remains a pedestrian space. Many people, especially students use this space as a through way to get from one side of campus to the other. The central location of the site makes it a main artery on which students travel, mostly on foot. There is no reason for vehicles to enter the site. Some vehicular traffic must be allowed to pass through the site, such as emergency vehicles, but overall the addition of vehicular access is strictly forbidden.

In close conjunction with the desire to keep the space a pedestrian one, is the need to maintain delivery area to the Theater. In order to assure that the space remains a pedestrian one, some accommodations must be made. Currently deliveries are made to the Theater through the plaza. This mixes pedestrians and vehicles which ultimately causes problems. A redesigned delivery area will be needed to achieve pedestrian and vehicular separation.

At present there is a cafe just off the site. The client wants this cafe to be incorporated into the plaza to add to the diversity of experiences for the user. The client hopes that with the incorporation of the cafe into the plaza more business will be generated, therefore creating more revenue. The redesign of the space must allow for this expansion to take place yet be a comfortable place to sit and enjoy lunch or a snack.
The client has expressed the desire for a focal point in the plaza. The shape and form of this focal point is entirely up to the designer. The focal point must be a centrally located element or space that is accessible to all to interact with.

Finally, the client has expresses a desire for a space that can be used throughout the day and night. Currently the plaza is used well into the night as the library is open until twelve in the morning. After hours study in the library goes on until two in the morning. With the addition of the student center across McKinley Avenue, the Development Board believes that the plaza will see increased use during the night. Therefore the design of the plaza must incorporate the use of light. Lighting must be used to add to the feeling of vibrance in the plaza.
The Campus Area

This space is one that is constantly being used by students. A general inventory reveals that the space is a link between the residence halls and the rest of the campus. Students must pass through the plaza in order to get to the older half of campus on which a majority of academic buildings are located. Students must pass through the site to get to the administration buildings, too. The Village, the little portion of Muncie devoted to businesses catering to the need of students, is also easily accessed through the plaza to the south.
INVENTORY

University Plaza

The plaza itself is often a destination as the buildings in the space are important to student activity. Bracken Library is the northern border of the site. The library is open all day, every day. It is open well into the night with after hours study areas open until two in the morning. It is a destination that has a constant flow. Students need to use the library all day long in support of classroom work. The library has meeting rooms and several classrooms to that are used by a variety of student organizations.

University Theater is located to the south of the plaza. The building is home to two theaters and several small classrooms. University actors, actresses and technicians work their magic in this building. The productions cater to the visual senses with a variety of performances and exhibitions every year. The back doors of the Theater enter the plaza but are probably used more frequently than the front doors due to the activity in the plaza. The proximity of the theater from these doors also makes it easier to enter from the plaza. The close proximity also means that during production intermissions, the plaza is used as an outdoor lobby. Many go outside to smoke, purchase concessions or simply stretch their legs. Because this is the back of the building, it is the delivery area for University Theater and Emens Auditorium. There is a loading dock where all the material for the productions brought into the building. This area has extensive use as the loading docks are used by both the theater and Emens Auditorium. Emens Auditorium provides seating for 3600 people and is the location for everything from concerts to off Broadway musicals for the Muncie area. These musicals are major events on campus and in the community. These shows travel across the country with up to three semi-trucks and two busses. Currently there is room for two of the trucks and one of the busses. The delivery area also maintains an entrance for smaller deliveries such as food and personal items for the performers.
Pruis Hall is on the eastern border of the plaza and is the location for many different kinds of events. Seating seven hundred, Pruis Hall is used most for musical recitals but also for speakers and large classes.

Just off the site is a small cafe that serves nachos, hot dogs, and other snack foods. Next to the vending area are four attached tables. The cafe is open only during the warm months. When it is nice, tables, food and an awning are trucked out to the site. The entire operation is portable with the exception of the tables. As it has been addressed in the program provided by the client this cafe is to be incorporated into the new plaza but on a larger scale.

Access onto the site is limited to several entrances. Pedestrians from all areas have access to the site through somewhat controlled entrances. A majority of pedestrian traffic comes from the McKinley Avenue sidewalks. The axial alignment of the new part of campus means that many students walk up and down this road. There are two entrances off of McKinley Avenue that form the western entrances. From the north there is an entrance as well as the southeast. These, however, are minor access points. The entrance in front of Pruis Hall is the most used entrance from the east. Basically people enter from a variety of locations, are funneled into a central plaza and disperse out through a series of exit points. Another access point that should be noted is a shuttle bus stop off of McKinley Avenue. The shuttle bus carries students along the McKinley Avenue axis. During the winter months and days when the weather is poor (which seems like all the time) many students choose to ride the shuttle bus.
Overall, the space is an excellent place in which campus activities can take place. Its central location, and heavy pedestrian traffic make it the ideal campus location for a campus center. The variety of uses in and around the space add to the variety of possibilities that exist for new designed elements to be added. However, the overall design of the plaza as it currently exists lacks many key features of a good pedestrian plaza.

The entrance into University Plaza off of McKinley Avenue is lacking a sense of entry as it is designed right now. There is a need to create an entry that is both aesthetically pleasing as well as exciting, announcing to the pedestrian that they have arrived in a vibrant space. This entrance should also display that the plaza takes advantage of light to enhance the sense of place.

The next section displays the homogenous treatment of the space that currently exists. There is no sense of movement through the plaza, as this area currently looks like the endurance. The new design will create open and closed rooms so that as a pedestrian moves through the space, the scale of the spaces will vary. This same idea will be used in a creative lighting plan in that pedestrians will move from light to dark spaces.
The inventory of the plaza has shown that buildings that surrounding the space have a variety of uses that take place throughout the year. The space outside these buildings currently do not reflect these activities. They are generic spaces that do not tell the pedestrian what building they are near. The space outside the buildings should be an outdoor lobby for that building.

Similar to the entrance off McKinley Avenue, the entrance into the plaza behind Pruis Hall lacks a sense of entry. This area is also a transition to other areas that may be designed later and should acknowledge this fact. A less dramatic endurance is needed, however, the pedestrian needs to know that they are approaching the plaza and this is currently not the case.
The needs of the client become more evident as an analysis of the site is done. The reasons for the desire for the space to be pedestrian by the Development Committee is clear. The pedestrian and vehicular traffic often becomes intertwined near McKinley Avenue. Both access the site through a common point. This common point leads to a dangerous mixing of cars and pedestrians. The clients desire for separation is a valid one, and steps must be taken to create a different access point for deliveries.

The clients desire for the integration of the cafe into the plaza is also valid. By integrating the cafe a more vibrant plaza will be created. Students will be encouraged to sit down and enjoy a snack between classes or in free time.

The client has also expressed desire for a focal point in the plaza. The current amphitheater is a good place for this as it is currently not used. The amphitheater is a barren void of concrete that is too cold to be used by people. The amphitheater is also an ideal focal point because it is the center of a triangle formed between Pruis Hall, University Theater, and Bracken Library.
The redesigned master plan for University Plaza fits with the Campus Development Committee's desire for a vibrant pedestrian space on the campus of Ball State University. The design is a partial redesign rather than a completely new design. The plaza was found in the analysis stage to be a good start in creating a plaza. The master plan reflects this in that there is limited new construction. Additions that have been made are simple planting reconfiguration, mounding and the addition of details that can be constructed off-site then assembled in the plaza. When new construction has been done, it is only in limited areas. Such new construction areas would be the breaking of the wall just outside the library to create a cafe space. Another such example of this is the creation of a new loading dock. Overall the redesign tried to work within the framework of the plaza while still creating a new vibrant space.

The master plan tries to incorporate areas of light and dark, so that as pedestrians move through the space different feelings and perceptions take place. The first such area is the entry into the plaza off of McKinley Avenue. This area has been screened heavily with plant material to create dark shade. The species used are Maples that have a dense leafing creating dark patterns. Over the actual entrance a soft canopy structure has been placed. These too create a darker feeling. However the dark feeling that they create is in contrast with the Maples. The canopy structure filters light more so that the structure almost seems to glow. This canopy glows both at night and during the day. During the day natural light filters through the membrane. At night the entire canopy can be light from the underside.
**The Canopy Structure**

Soft canopy structures are those structures in which every part is loaded in tension. By loading every element in tension, a more efficient structure is created. This also allows slender structural material to be used in for support. Tension structures are therefore a very appropriate way to build when a minimum amount of structural material is desired, because of functional or aesthetic reasons.

The design of tension structures is very complex in that the whole system needs to be in equal tension. If any area of the canopy or the structural support system is not equal with the rest of the system the overall stability is compromised.

Many pieces come together to form the final structure. First a canopy shape must be chosen. There are many different canopy shapes ranging from very simple hyperbolic paraboloids and double-ring cones to complex saddle shapes. The material the canopy is made of is must also be chosen as different materials produce different end results. Structural materials must also be chosen including the supporting members, the connecting plates and the tensioning members. Many parts go together to form a tension structure, however when built, they form a light airy structure which is both practical and beautiful.
Walking further into the plaza, the cafe space is encountered. This space is meant to be initially very bright, in strong contrast to the dark entry. The vending table is located just off the main circulation route in order to encourage spontaneous purchases. After the purchase is made, tables have been provided. It is now that the user encounters a choice. The user can choose to either sit in the sun or sit in the part shade of Locust trees. The Locust was incorporated into the design in hopes that the filtered quality of light under them can be taken advantage of by users. Tables can be moved into the trees so that the user can tailor the space to the time of day as well as their needs. Also amongst the trees is a trellis. The trellis is constructed of material that are used in other parts of the plaza to be discussed later. From this trellis hangs small lights that can illuminate the table underneath. The lights create a feeling of personal space encouraging night time sitting.

Across from the cafe is a large expanse of turf. This panel is a sitting lawn. On warm days students can choose to sit on the lawn if they prefer or if all the tables are taken in the cafe. This space is meant to be a more natural space within the plaza. At night the space will be light in a more natural manner keeping with a natural theme. Substantial screening with both mounding and plant material will take place. This will create a small amphitheater like effect. This is needed to screen the bad views of the delivery area of University Theater.
The delivery area of University Theater has been completely constructed. The loading docks now face the west instead of the north. This means the drive had to come in off of McKinley Avenue. When deliveries need to be made they can simply turn in and make their delivery. Limited parking has been provided for so that this can take place. If the loading dock needs to be used as is the case with large trucks (used in the hauling of the productions for Emens Auditorium), Trucks will no longer have to fight pedestrians walking in front or behind them creating dangerous situations as they back into the docks.

Upon walking through the café and natural spaces in the plaza, a dark wall is created by another series of Maples. This wall is meant to provide a transition to the next series of spaces.

The next series of spaces are the outdoor rooms of the three buildings of the area. The first encountered is the trellis system outside University Theater. The trellis is an outdoor extension of the theater. This space clearly belong to the theater, as the details suggest. Lighting in this area is varied. It can be altered as to the season or as to productions that are currently running inside.
University Theater Trellis

The University Theater Trellis is meant to emulate the rigging systems that are used on the theater stage. This rigging system has been used in theater productions for many centuries and is a way to attach scrims to overhead battens which are supported off stage. This system is very versatile as many different scrims can be used for one production and each must be easily raised and lowered. The system used in the plaza also supports scrims upon which different colors of light is shown. These scrims, like the ones used in stage productions can be changed as well as the lighting on them. The structural members of the rigging system have been slightly different than those used in the theater. These rigging members are crossed braced steel pipes which are supported by cables.
The library space is a formal planting of colorful ornamental trees. This space is more of a passive area in which to walk through on the way to the library. Very little else will actually take place in this outdoor room as the library is the main focus as you approach.

The next outdoor room is outside Pruis Hall. This area is not be designed by the landscape architect, as an environmental artist has been brought in to do a site specific design. The concept for the space has been proposed, though what the final design actually looks like is yet to be determined. The space is meant to be a light garden. Sheets of dichroic glass are to be positioned so that they cast light on the ground plane and Pruis Hall. Dichroic glass filter light through allowing only certain wavelengths to pass through. This means that color can be abstracted from natural light allowing for a poetic display of light. This poetic display is reflective of the concerts that take place inside Pruis Hall. An entire light show will be composed in the immediate area that changes as the day and seasons pass.
Robert Irwin

"The intention of phenomenal art is simply the gift of seeing a little more today than you did yesterday."

Robert Irwin has been selected for this aspect of the project. He is done similar installations in the past. His art he believes can change perception of people that interact with it. Irwin's art fits very well into the concept that has been developed for the light garden outside of Pruis Hall.

"Two Violet Running V Forms"
As the user leaves the space through either of the exits they again experience the dark sense that is felt in the entrance off of McKinley. This sense is also felt if the user is entering the space from these entrances. The experiences are thus the same whether you enter from the east or the west ends of the space.
**BIBLIOGRAPHY**

**Texts**


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Periodicals


