HALF-LIT
Georgetown University Center for the Study of Light

Michael J. Sutjipto

Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of Master of Architecture in Architecture.

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Abstract

It is the intention of this thesis to explore the idea of half light, as put forward by Luis Barragan:

"Architects are forgetting the need of human beings for half-light, the sort of light that imposes a tranquility, in their living rooms as well as in their bedrooms."[1]

The exploration will occur through photography, writing, and architectural design. But most of all, the emphasis will be on developing a rich internal vocabular and set of intuitions, and then see what architecture emerges from these intuitions.

[1] Frampton *Labour, Work, and Architecture*, 29.

Acknowledgements

To my committee: Marcia, Paul, and Jaan.
Thank you for your constant criticisms, suggestions, and words of support. And thank you for pushing me farther than I would have gotten on my own. This thesis would not be what it is without you.

To the graduate faculty in Blacksburg.
Thank you for all of your words and for instilling in me many of the ideas and attitudes that came through in this thesis. I can be a quiet student, but I am a good listener - so thank you for giving me many things to listen to.

To my friends, family, and colleagues.
Thank you for all of your support and inspiration. Thank you for making me laugh and for the balance you bring to my life.

To my Mom.
Thank you for your support, love, and patience in everything that I do. It means the world to me.

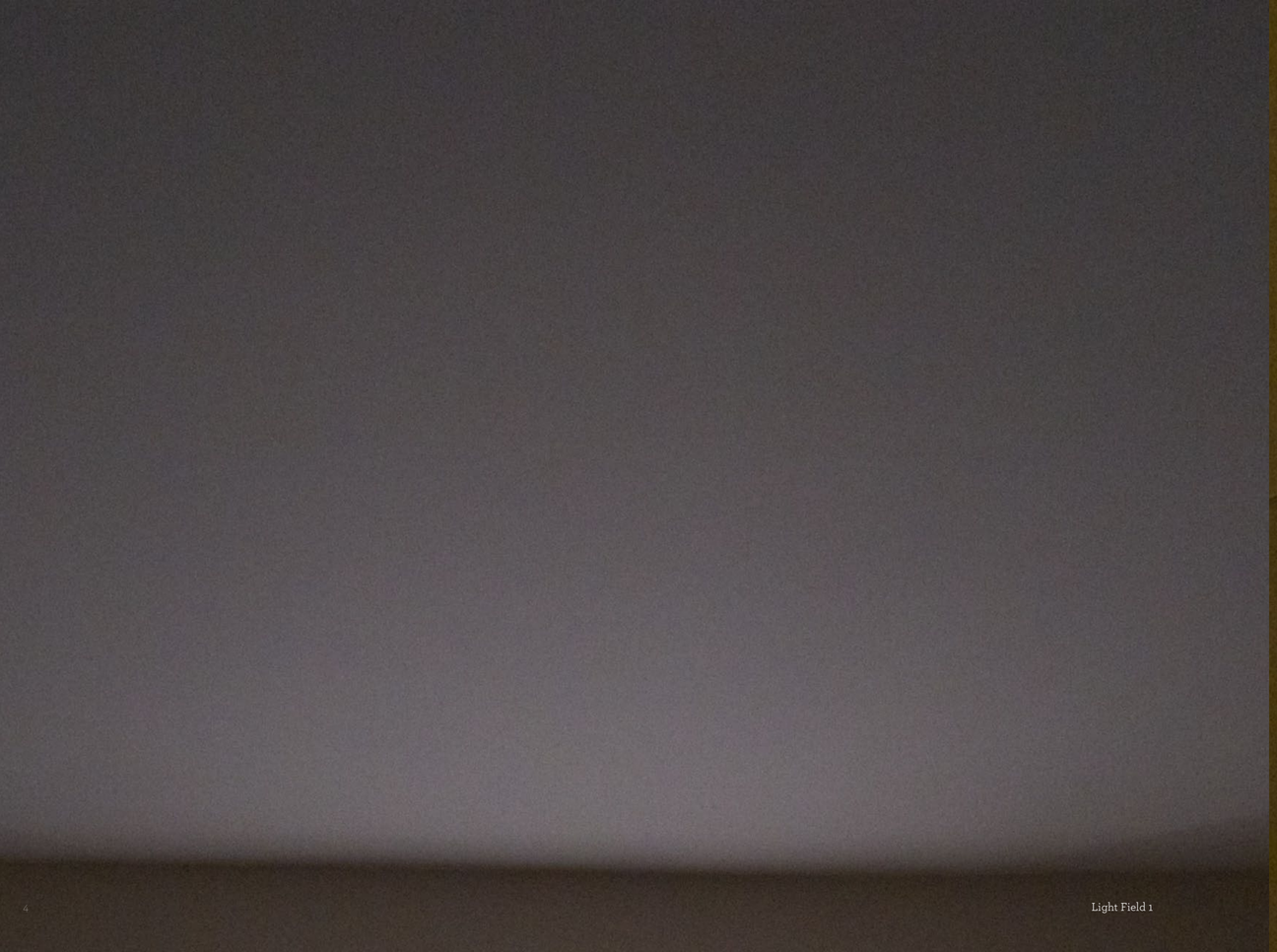
Table of Contents

List of Images

Every artist has an internal vocabulary, words forced into being by the desire to express. I believe the articulation of subliminal thought is one of the most authentic forces within the creative process. This internal vocabulary follows the artist like a shadow; it is an instrument or tool of the creative process. How the artist formulates his or her expressions is singular, since they are a reflection of the individual's personality; but common to all is the manipulation of intuition. These subjective translations of thoughts are part of the internal vocabulary, and it is this vocabulary that the artist leaves behind in his or her creation.[1]

Per Olaf Fjeld

[1] Fjeld, *A Pattern of Thoughts*, 107.



Light Field 1

Light Field 2

[1] Frampton *Labour, Work, and Architecture*, 29.

Introduction

In his essay, "The Status of Man and the Status of his Objects", Kenneth Frampton speaks of the loss of privacy and private space. To this end, he quotes Mexican architect Luis Barragan (at left). Barragan continues further:

We should try to recover mental and spiritual ease and to alleviate anxiety ... the pleasure of thinking, working, conversing are heightenend by the absence of glaring, distracting light.

While Barragan and Frampton's thoughts about the loss of privacy are themsleves worth exploration, that is not the purpose of this thesis.

The purpose of this thesis is to explore this notion of half-light that Barragan offers. It is the intention of this thesis and this book to develop a series of intuitions and reactions that revolve around his idea. They will be developed through constant pondering of the question, "What is half-light?" -- however no answer is expected or required. Rather, the personal world and vocabulary developed through this questioning is of the utmost importance. As Per Olaf Fjeld states:

This internal vocabulary follows the artist like a shadow; it is an instrument or tool of the creative process. How the artist formulates his or her expressions is singular, since they are a reflection of the individual's personality; but common to all is the manipulation of intuition.

It is this thesis's position, as it is Fjeld's, that the internal world an architect formulates through their own vocabulary and intuitions is the most powerful creative tool they have. It is this thesis' intention to develop an internal vocabulary and a rich personal world in the mind of its author, and then to allow a piece of architecture to emerge from that world.

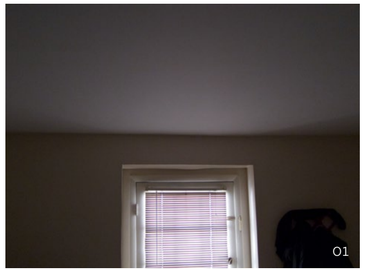
Exploration Through Architecture

The means of the study will be through photography, drawing, and personal observation. But most of the all, the study will occur through the design and development of a piece of architecture.

Left Light bounces off of a wall.

Initially, the exploration into half light came through daily observations and personal ruminations. Barragan's idea seemed intimately tied to ones own living and work places. As such, it was imperative to focus more on personal day-to-day experiences -- to observe mundane things and moments, and to get a sense for the indefineable qualities of light during these moments.

What follows are a series of photos taken throughout the thesis. The photos depict normal, daily moments, and, while they were not explicitly taken for this study, are included because there is something about each of them that seems relevant to half light.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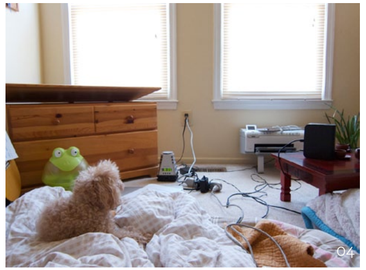
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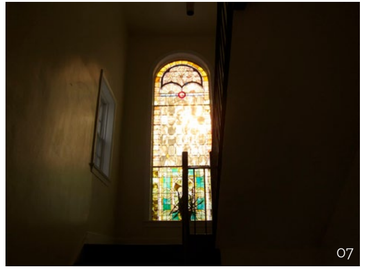
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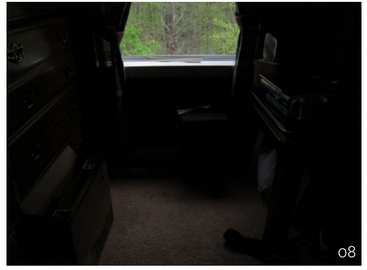
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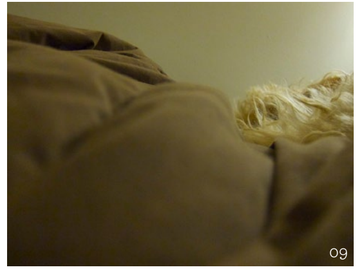
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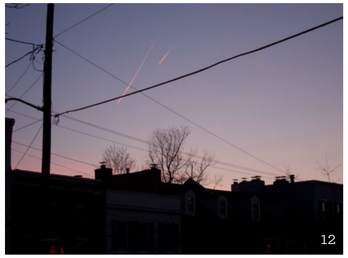
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13


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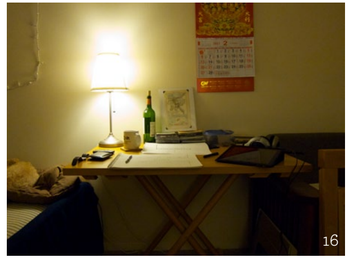
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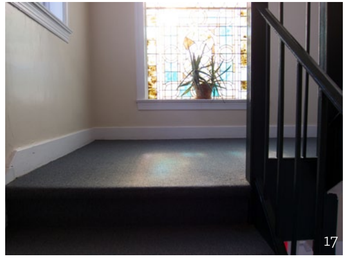
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18


19


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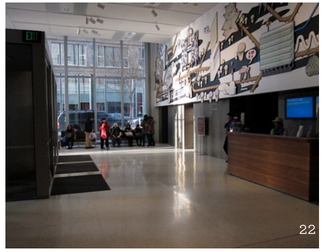
21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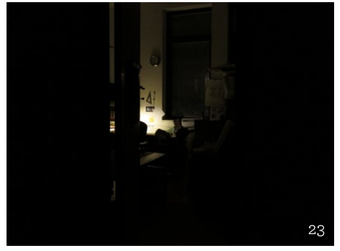

23


24

1. Morning light through the blinds.
2. WAAC lobby.
3. Peter walks through Georgetown.
4. Kimie in the morning.
5. Kimie in the evening.
6. Studio desk, 1:00 AM.
7. 207 S. Patrick St., early morning stairwell.
8. Bedroom, late afternoon.
9. Kimie takes a nap.
10. Ducks in the Potomac River.
11. Old Town Alexandria in the evening.
12. Dusk sky.
13. Dusk sky.
14. Bicycle in the afternoon.
15. Max relaxes.
16. Work desk in the evening.
17. 207 S. Patrick St., late morning stairwell.
18. Studio desk in the afternoon.
19. Home Depot parking garage.
20. Baltimore, view from Fell's Point.
21. Georgetown Apple store.
22. Seattle Art Museum.
23. Studio desk, 3:00 AM.
24. Yoshi plays Street Fighter.

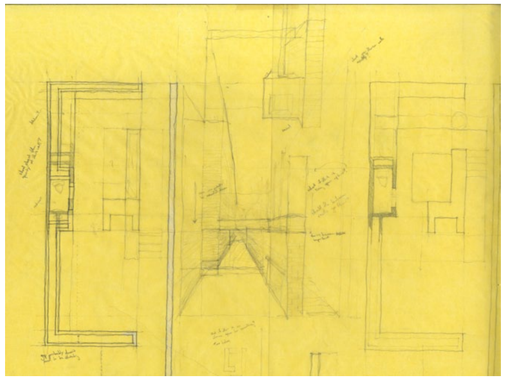
A Small Home in Old Town Alexandria

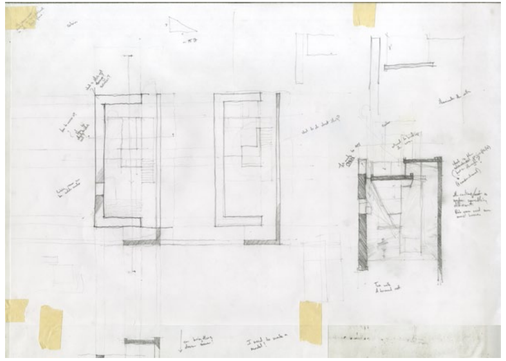
The first architectural investigation into half light was through the design of a small home in Old Town Alexandria. The house would be home to a small family of three - there would be two bedrooms, two bathrooms, a living room, and kitchen. It was to be a very modest home; a quiet and peaceful place for a small family.

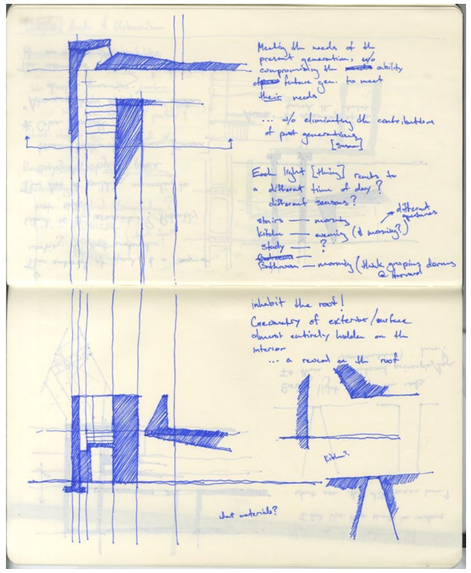
The home itself was to be sited in an alleyway in Old Town Alexandria. Being off of the main road, a site of this type was thought to offer opportunities to explore themes of privacy and light.

This idea never moved beyond conceptual sketches, however, many of the early ideas and methods of inquiry regarding half light find their root in this incomplete project.

Proposed alleyway site.



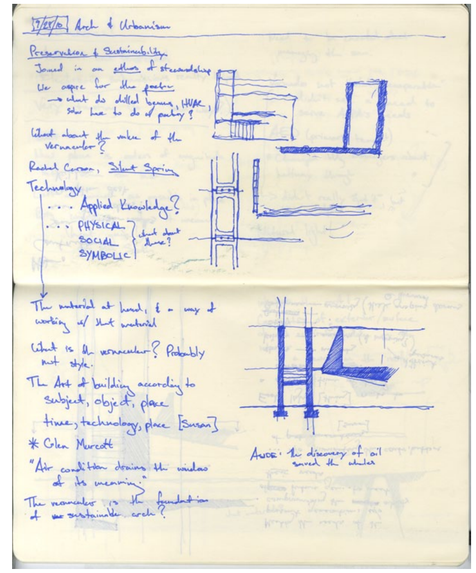




Top Left Perspective sketch down main corridor of home. **Top** Thoughts about bringing light into the terminal area of a stairway. **Left** Thoughts about bringing light in through the ceiling. **Opposite Page** Thoughts about bringing light in through the ceiling. Notes from an unrelated class.

Much of the work at this stage was put into developing various ways to bring light into the home. The focus was on particular moments, e.g. how to bring light through the celing and into the living room, or how to bring light onto a stair landing. The ability for light to help define moments, or to even be the moment itself, is an idea that becomes important throughout the rest of this thesis.

Also visible here are ideas about the nature of the apertures themselves. There is an effort to "funnel" light into the home using the negative space between masses. The masses themselves are anonymous -- they are no particular material, nor do they bear any architectural qualities at this point, beyond representing the positive space. Again, this theme of "funneling" light would persist throughout the thesis.

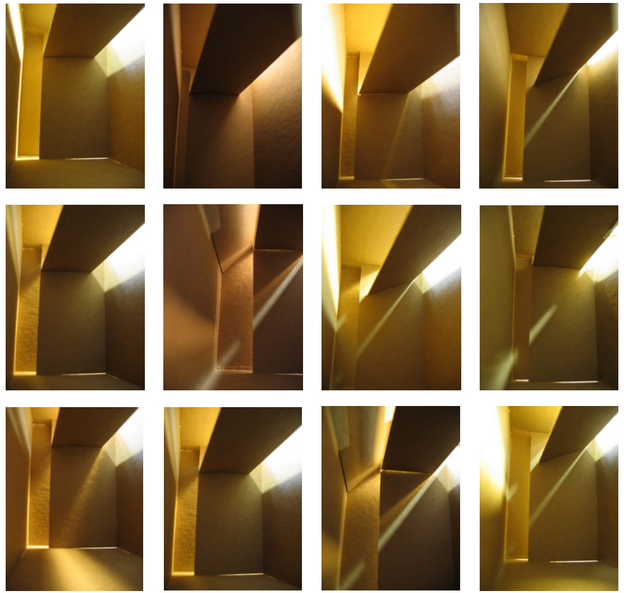


Light Studies

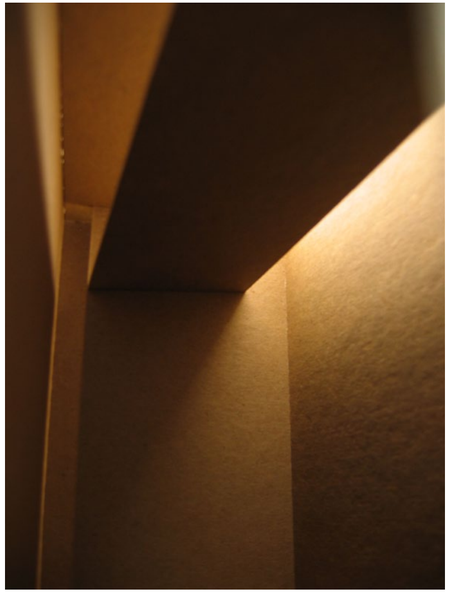
The most enduring effect of the Old Town project were the light studies produced -- both the method of study and the studies themselves. The aim here was to get a grasp of the various qualities of light that could be brought into the space. By constructing a model out of chipboard and shining a desk lamp into it from various angles, a wide variety of light qualities were observed.

The studies herein are of no building or design in particular, and they are not architecture. But they are architectural in the sense that, by observing and listening to these studies, a piece of architecture may begin to emerge.

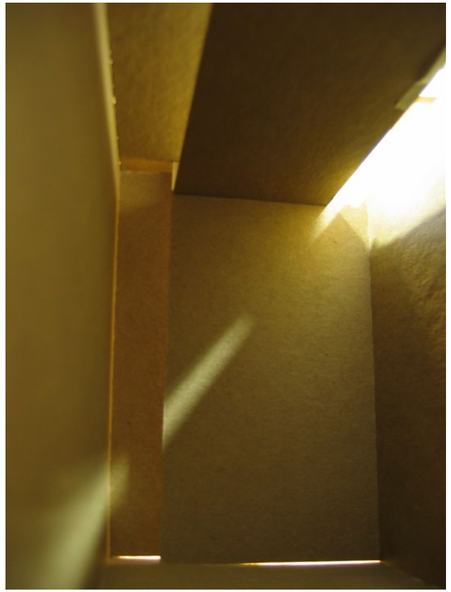
Light study, wall meets ceiling.



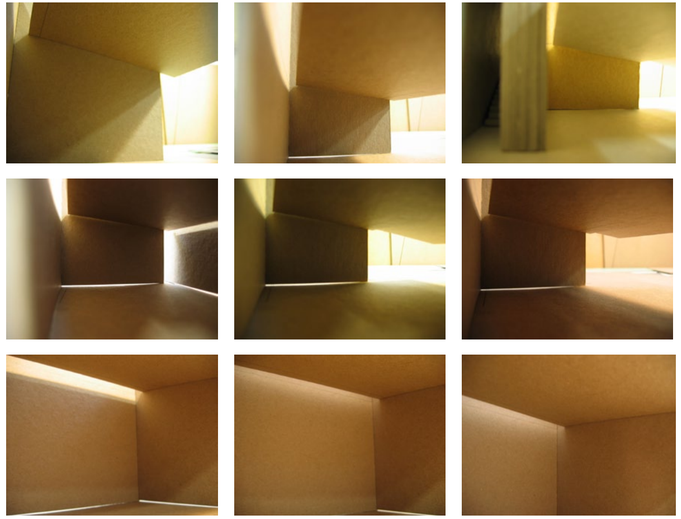
Light study series 1.



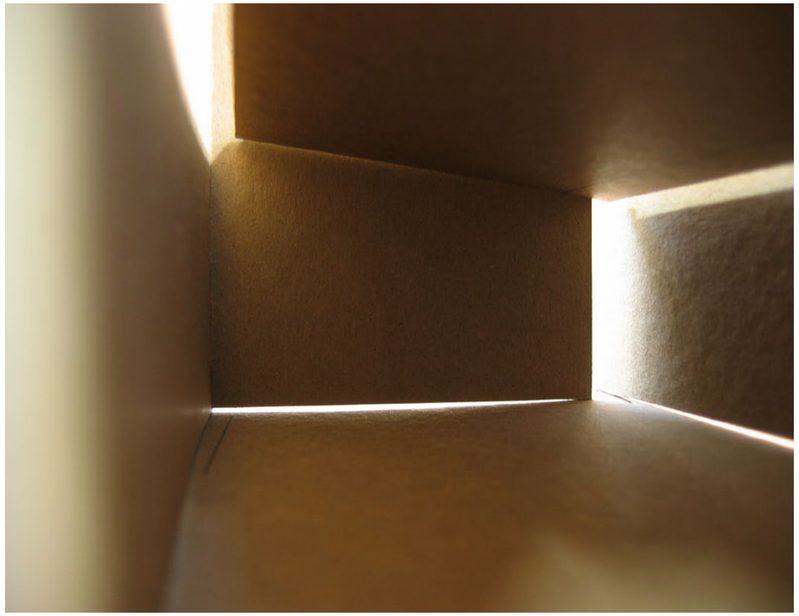
Soft light through a ceiling



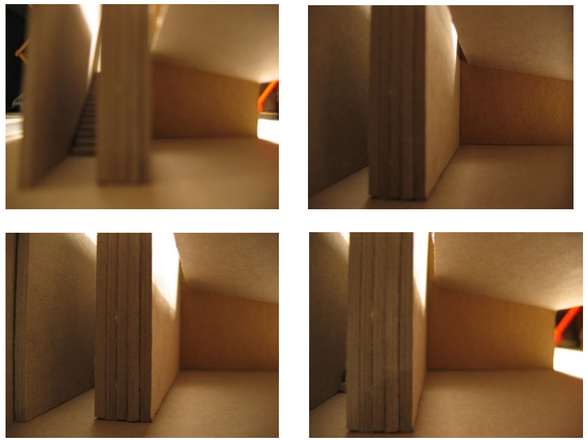
Direct light through a ceiling



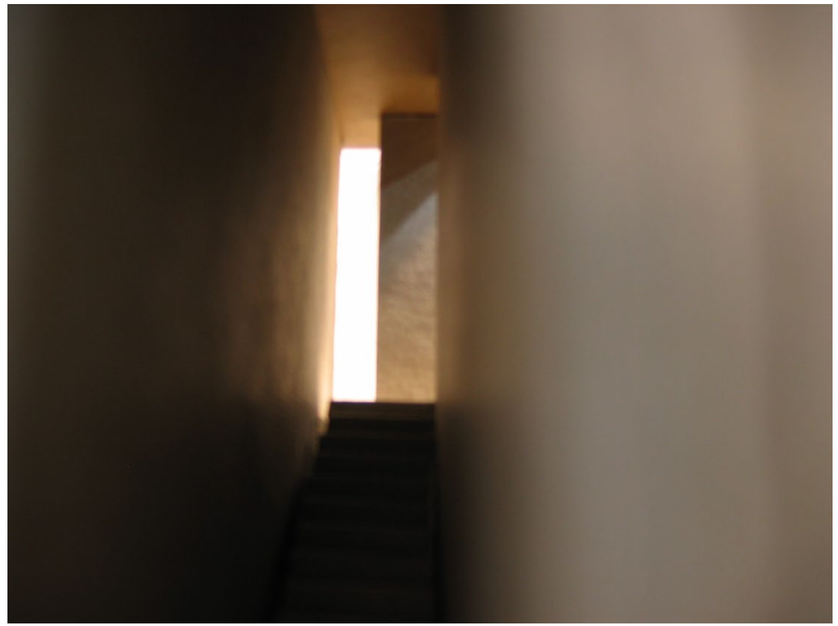
Light study series 2



Light enters where walls meet

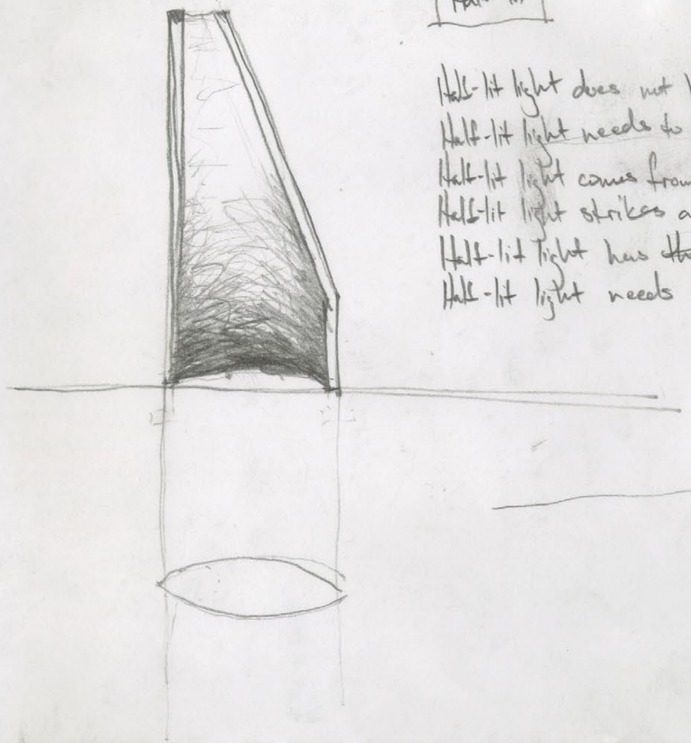


Light study series 3



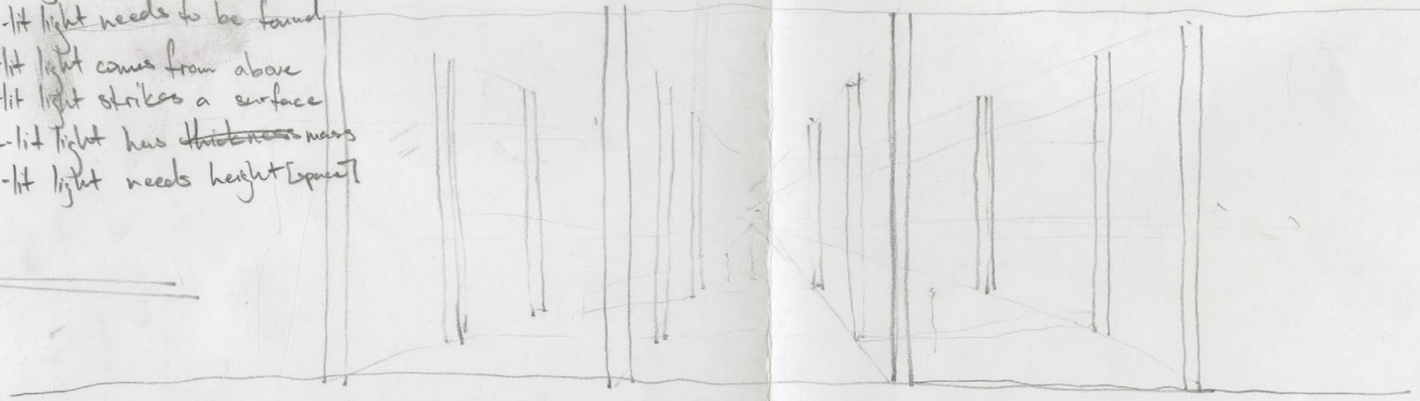
Light terminates a stairwell

Reflections

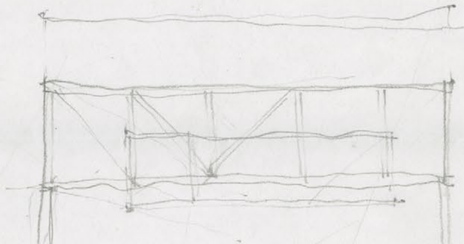


Half-lit

Half-lit light does not hit you
Half-lit light needs to be found
Half-lit light comes from above
Half-lit light strikes a surface
Half-lit light has ~~thickness~~ mass
Half-lit light needs height [space]



Transportation Hub
Gallery
–



The opening is just as important as the quality of light.
They are one in the same and

Opening ⇒ Walls

Half Light

The sense of half-light developed through the studies so far would find life throughout the rest of the thesis, and they would be the driving force behind most of the creative decisions.

The idea of half light itself is incredibly intangible, and, as such, it is hard to put ideas and notions concerning it into words. However, if there is anything to be said about half light, it would be the following:

Half light refers not only to a physical phenomena, but also to a particular mode of thought. From the beginning, Barragan had ideas concerning tranquility and privacy, and these things indeed are crucial to a sense of half light. But even more so, half light is the kind of light one finds when first waking up in the morning; or the kind of light one sees when looking out of a window and into the sky on a cloudy day. Moreover, it is the state of mind one has during these moments. It can be called daydreaming, but it is essentially the ability to fall into one's own mind and to allow oneself to meander.

Half-lit light does not hit you

Half-lit light needs to be found

Half-lit light comes from above

Half-lit light strikes a surface

Half-lit light has ~~thickness~~ mass

Half-lit light needs height [space]

Excerpts from sketchbook.
Original writing on
previous page.

The Georgetown University Center for the Study of Light

The building that eventually came from these studies is the Georgetown University Center for the Study of Light (henceforth referred to as "the Center"). Through the design of this building, ideas and intuitions regarding half light came to their fullest fruition.

The building is fictional and the program made up. The center is a research facility located on the Southwestern corner of Georgetown University. Its purpose is to bring together math, physics, and philosophy faculty for the common goal of studying optical phenomena. The program calls for private office space for faculty members, as as well shared offices for doctorate students. Classroom space will be needed for small lectures and presentations. A large auditorium space will be needed -- both to give the center a place to hold large lectures, but also to give the university at large a place to hold high-profile guest lectures. Lastly, space for laboratories is necessariy so, in particular, the phycisists may perform experiements.

Behind The Auditorium at the Georgetown University Center for the Study of Light

Siting

The proposed building is located on the Southwestern corner of the Georgetown University campus in Washington, DC. It occupies a previously open expanse of grass, right next to Wolfington Hall, the Jesuit Residence at Georgetown University.

The site itself is almost completely flat, with a total elevation change of about 1 ft. However, the site begins to quickly slope off as one heads South towards the Potomac River, crossing first Canal Rd NW and then the Chesapeake & Ohio Canal. In total, from the site of the Center to the Potomac River, there is a total elevation change of 100ft over about 500 ft - an average grade of 20%.

During the winter months, the site has a clear view of the Potomac and areas South. During the summer, the view is obscured only slightly by trees. Conversely, the site can be seen clearly from the Virginia side of the Potomac, and, as such, plays a role in the skyline of Georgetown.

Top Left Aerial view of Southwestern corner of Georgetown University. **Bottom Left** Aerial view overlaid with topographic lines. **Right** Hand drawn site plan with the Center inserted into the campus.

Relation to the Sun

As both the thesis and the program are concerned with light, the location of the sun relative to the site is of importance. The site lies at 38° 54' 20.87" N, -77° 4' 37.23" W. During the summer solstice, the sun strikes the site from its maximum altitude angle of 74.40°, 8° West of South. During the winter solstice, the sun strikes from a maximum angle of 27.65°, 1.63° West of South.

In general, as there is no tree cover, the site receives direct sunlight during all hours of the day, except when the sun is at its lowest angles (in the morning and evening).

The summer solstice and the position of the sun during this particular time, will be taken to be of great importance to the Center.. It is during this time that the maximum amount of light will be brought into the building.

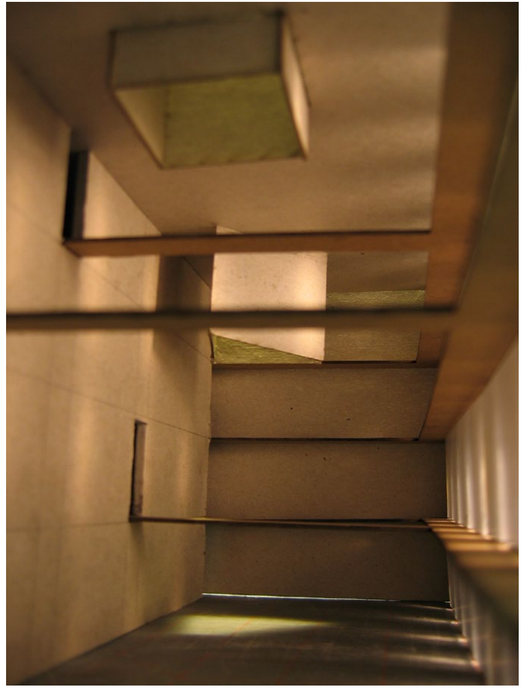
Early on in the development of the design, an extensive set of light studies were performed.

The following light studies were produced in a manner similar to the Old Town project. A model was built, mostly out of chipboard, to simulate an interior space. A desk lamp was then shone into the model, and the resulting lighting situations were photographed. With each new exploration and observation, slight adjustments were made.

The models here were built to study a certain kind of space - a large atrium, with large apertures protruding into the space, so as to bring in light. The atrium was envisioned as having offices on one side, with a series of bridges to take people to the other side, which was home to various laboratories. The bridges would cast shadows in the space.

Atrium light study.

Direct light, rectangular protrusions.



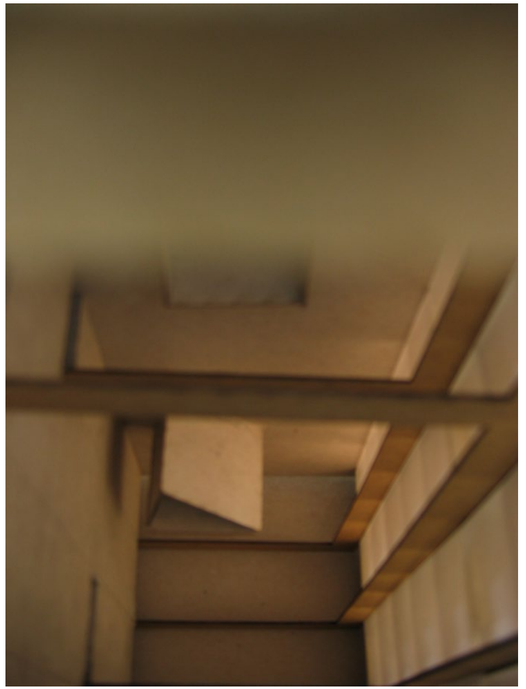
Soft light, rectangual and triangular protrusions.

Soft light, inverted protrusions.

Direct light, inverted protrusions.

Ambient light from offices reflects off of opposite wall.

View from a walkway.



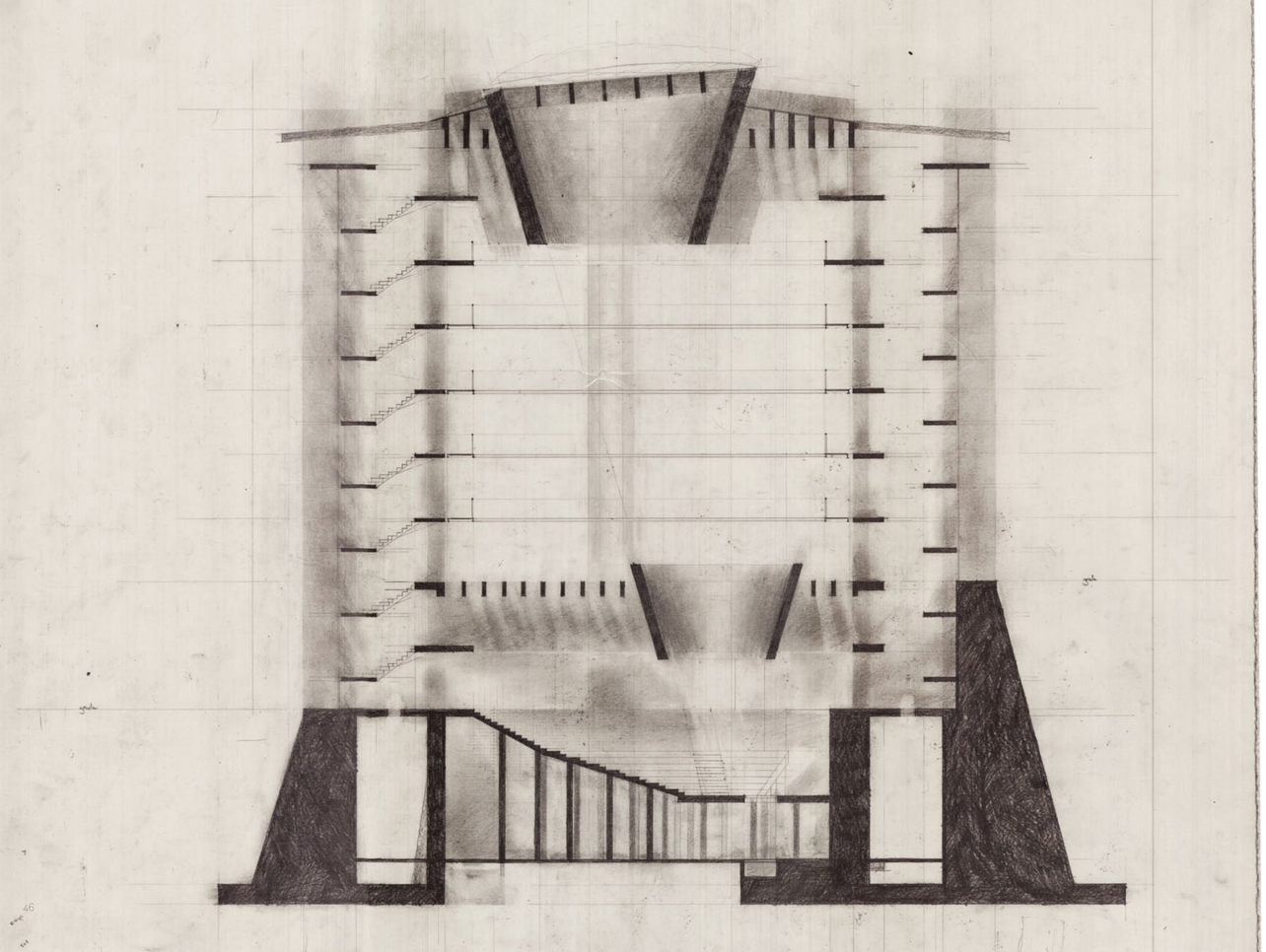
View obscured by a bridge.

Protrusions.

What follows is the final set of drawings for the Center, along with a description of the building. These drawings were rendered in graphite on 100 lb Strarthmore drawing paper.

The drawings are heavily worked into. This is for two reasons: (1) Many aspects of the building were worked out during the creation of these drawings, and thus much erasing was required. (2) The hope was that these drawings would attain a certain kind of weight, so that it would be possible express through them some quality of half light.

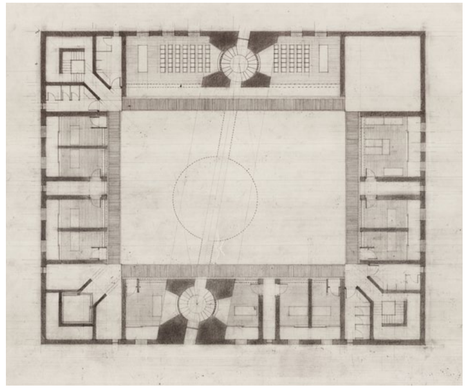
Behind Drawing paper, graphite, tape



Two Rooms

The center is organized into two large rooms - an upper room and a lower room.. Each of the rooms has a cone piercing through it, creating a continuous cut through the building. The cones provide a view to the sky above, but also bring light into the depths of the building. In particular, the cones are aligned so as to bring light into the heart of the lower room during the summer solstice.

Transverse section.



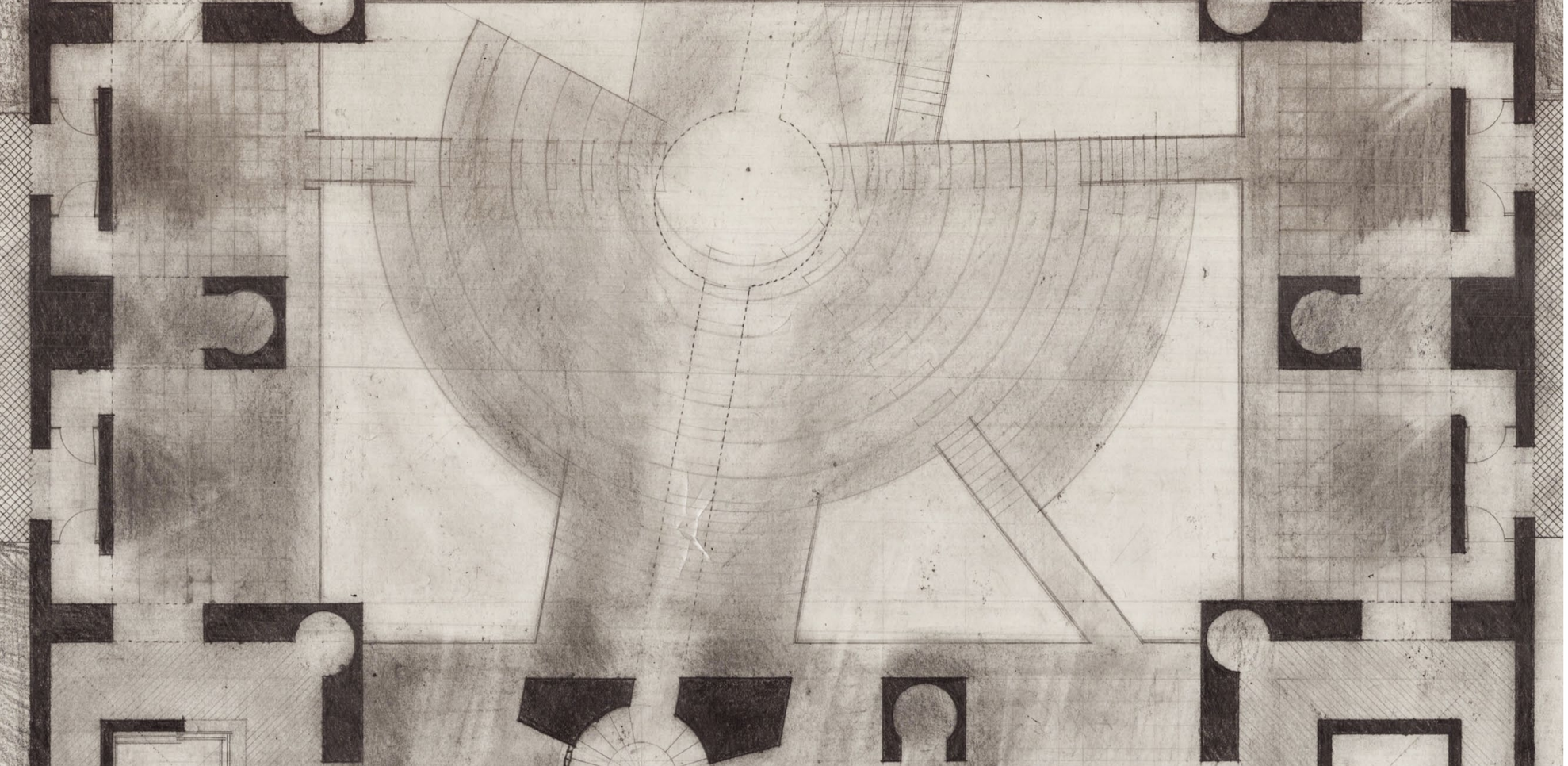
The Upper Room

The upper room is organized around a central atrium. Three of the four sides of the atrium are home to the various faculty and doctorate student offices. The fourth (Northern) side of the atrium is reserved for two classrooms. Stairwells, elevators, and restrooms occupy the corners.

Visible in the plan are two sets of four large columns, which serve as the primary supports of the upper cone. Down through the center of these four supports is a circular stairwell, which can circulate traffic throughout the complete vertical extents of the building.

The offices adjacent to these supports enjoy a unique space.

Top Left Typical floor plan of the upper room. **Right** Floor plan close-up.



The Lower Room

The lower room is home to a large auditorium, which serves both the Center and also Georgetown University at large. The auditrium can hold several hundred people and is reserved mostly for distinguished guest lecturers.

Circulation for the auditorium is provided around the perimeter of the space. From the perimeter, people may descend into the auditorium via any one of four stairs. The main stair into the auditorium is the completion of the circular stairwell through the center of the large columns.

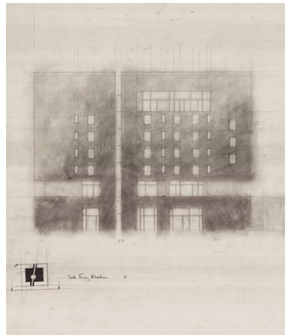
The speaker walks up from below the auditorium and lectures from the circular focal point of the auditorium. It is this place that is the destination of the light striking through the cone on the summer solstice.

Auditorium floor plan.

Structure of the Cone

The cones themselves are beams that are curved near the center and supported at their ends by a total of eight large columns. Secondary beams, radiating out from the cones, support the roof above. The space between the two large beams create a structural and spatial break down the entirety of the building.

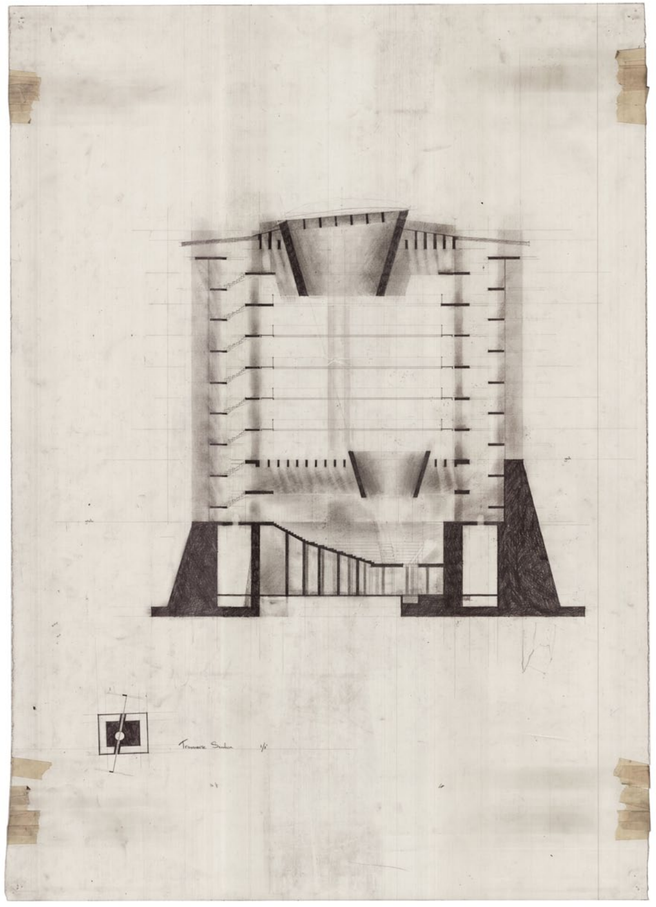
The cones and this break all bring light into the building. The break is angled at 8° West of South. The cones are at an angle of roughly 75° with respect to each other. This positioning focuses light into the building on the summer solstice.



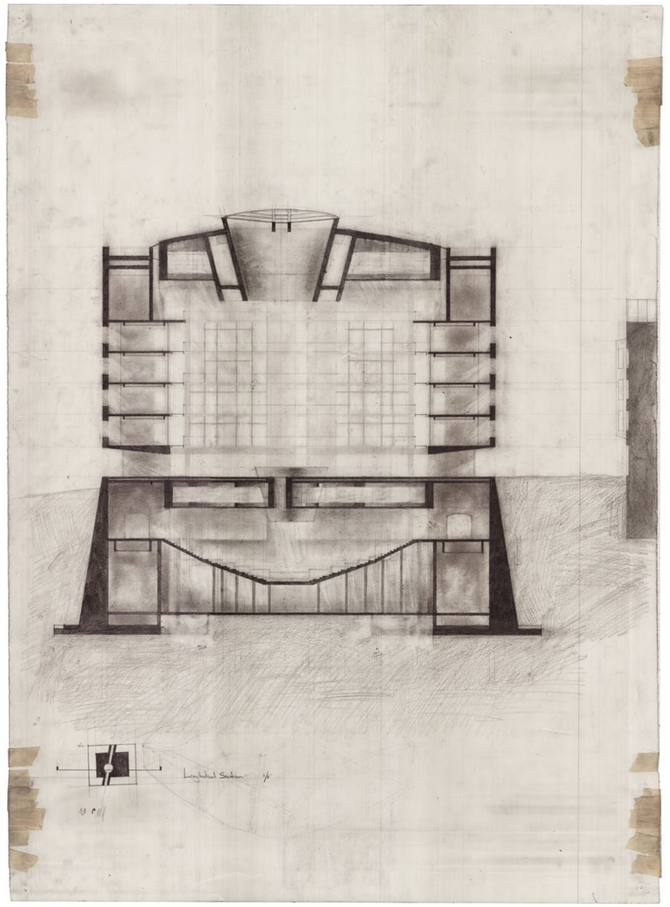
Above South elevation with visible cut through building. **Right** Cone level plan.

Georgetown University Center for the Study of Light

Drawing Set

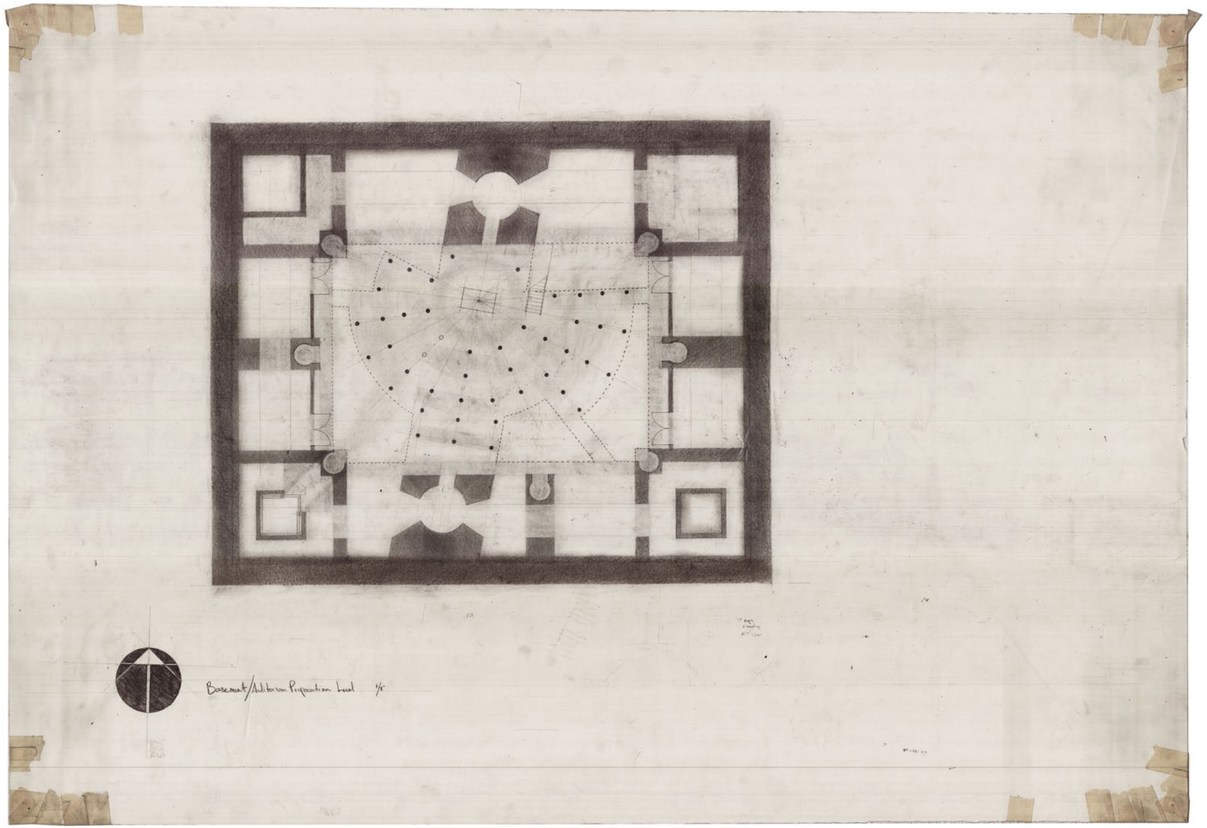


Transverse Section



Longitudinal Section

Southern Elevation



Basement/Preparation Level

The space below the auditorium serves as a preparation area for the guest lecturer, as well as for any demonstrations that will take place on the auditorium floor. The auditorium itself is supported by a large number of columns. Storage space and laboratories surrond the space.

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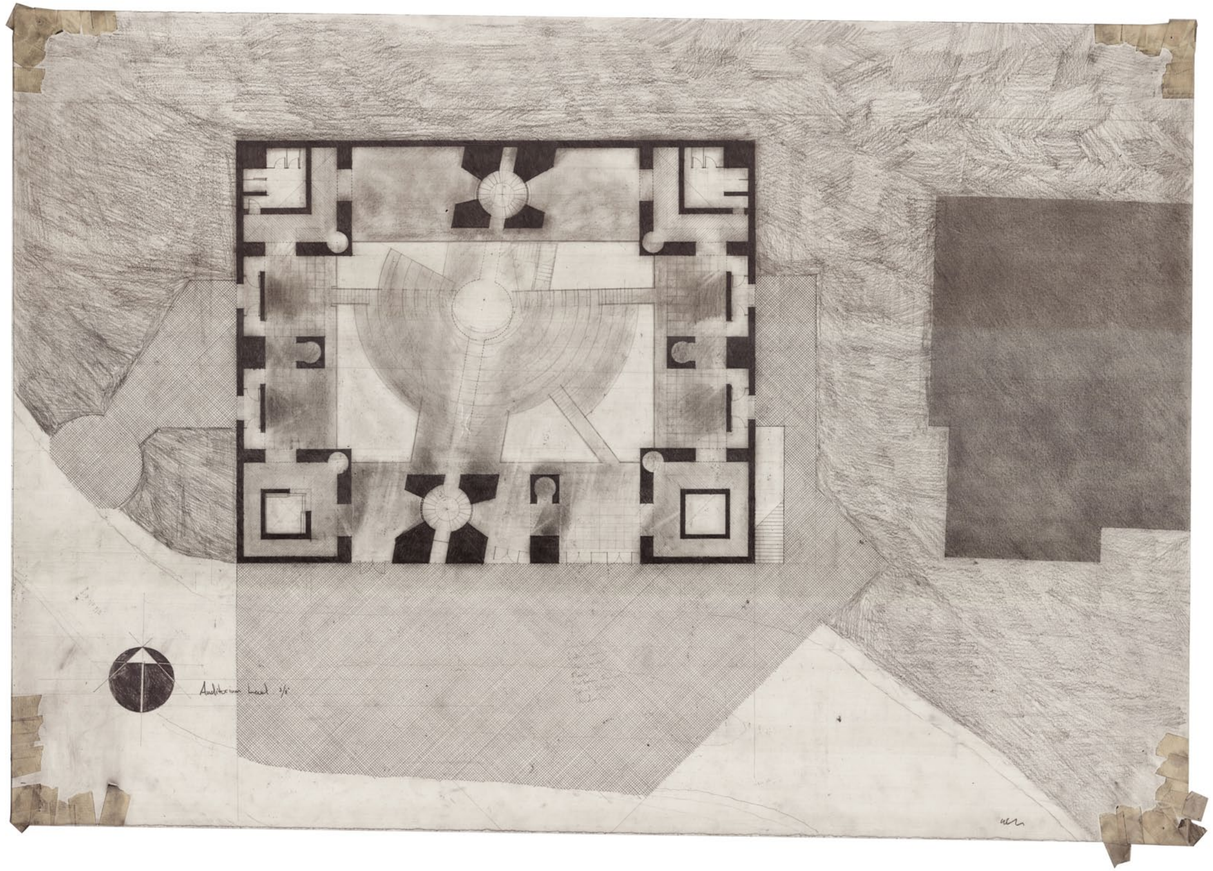

Auditorium Level

The auditorium, on its South side, has an entrance directly off of the entrance road into Georgetown University. As the ground slopes up heavily here, the North side of the auditorium is below grade. Circulation space is around the perimeter, and restrooms are located at the corners.

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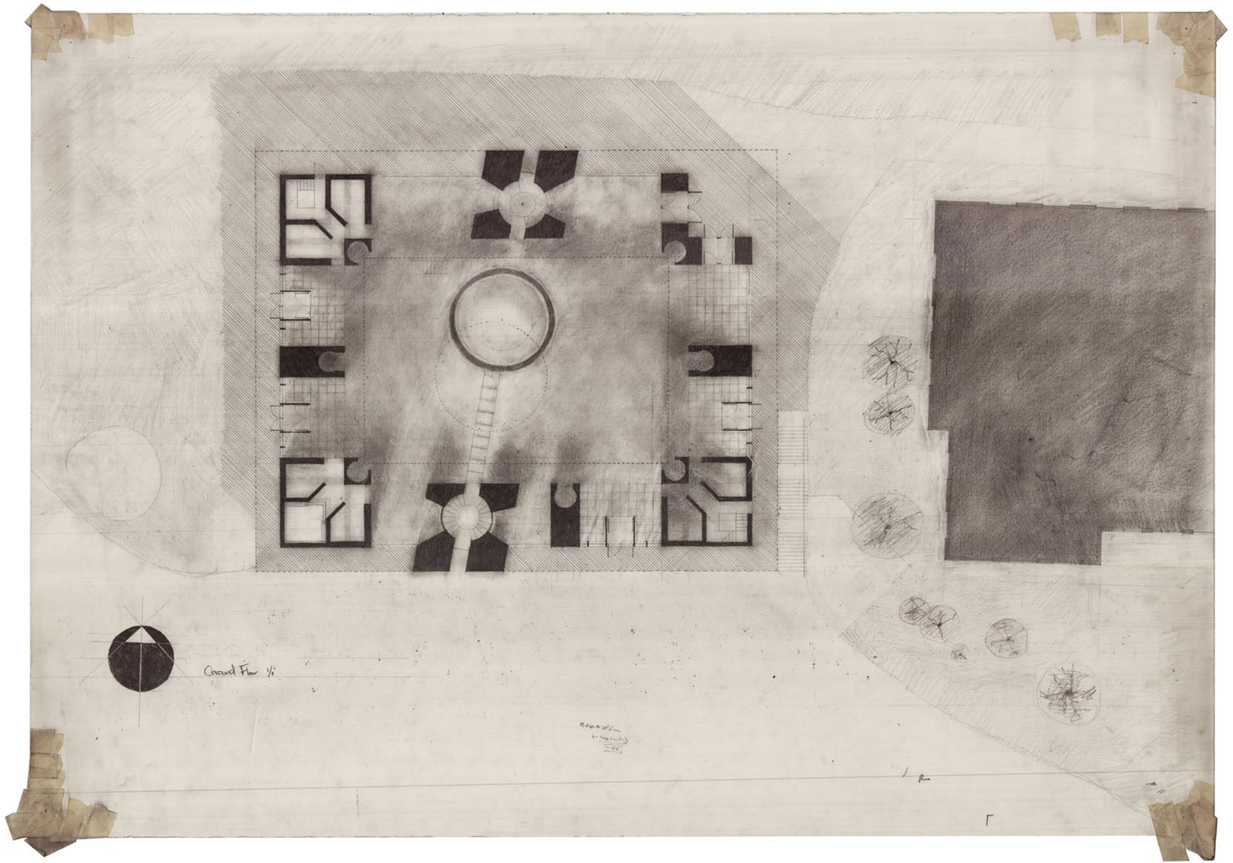

Ground Level

The main entry level. The building is situated directly along a sidewalk that leads east to the main campus. The sidewalk opens up into a plaza around the ground floor, from which there are several entrances into the Center.

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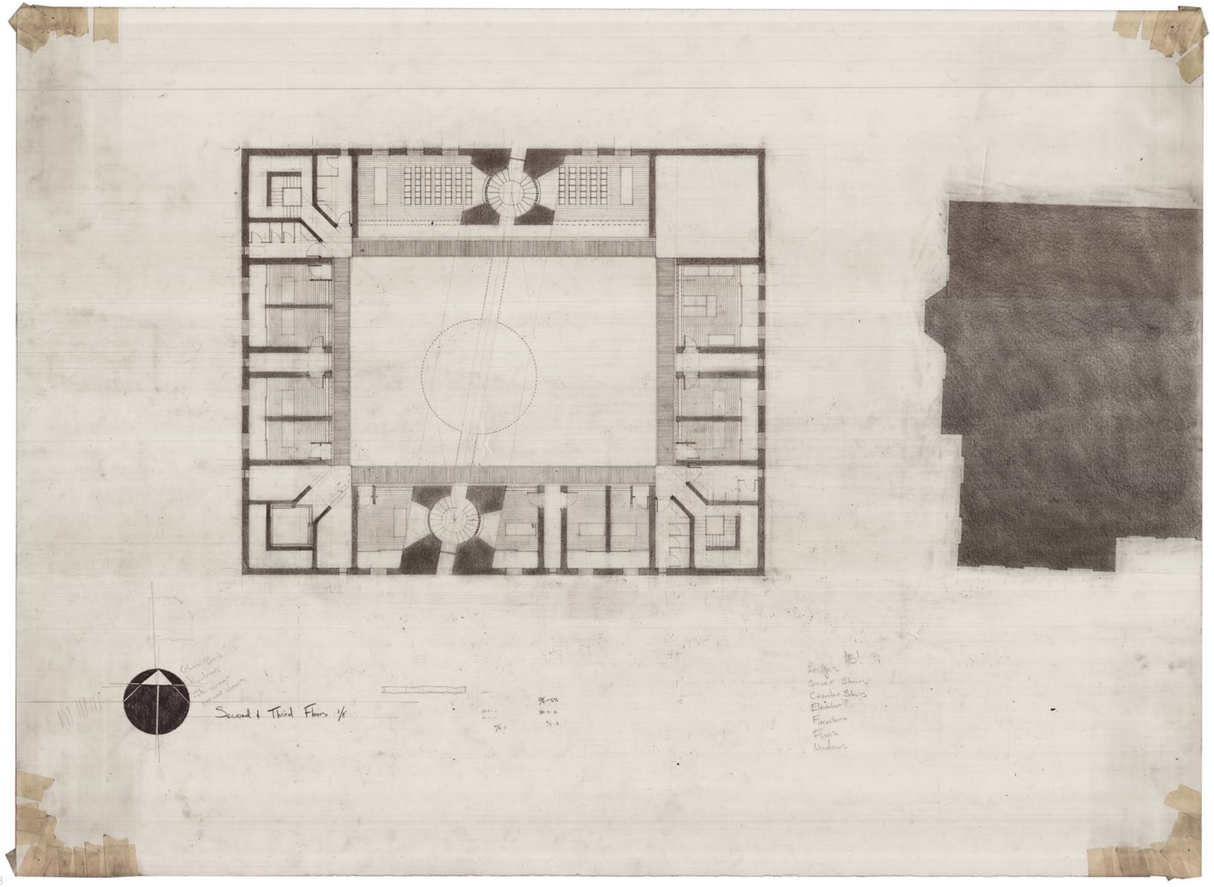

First through Fourth Levels

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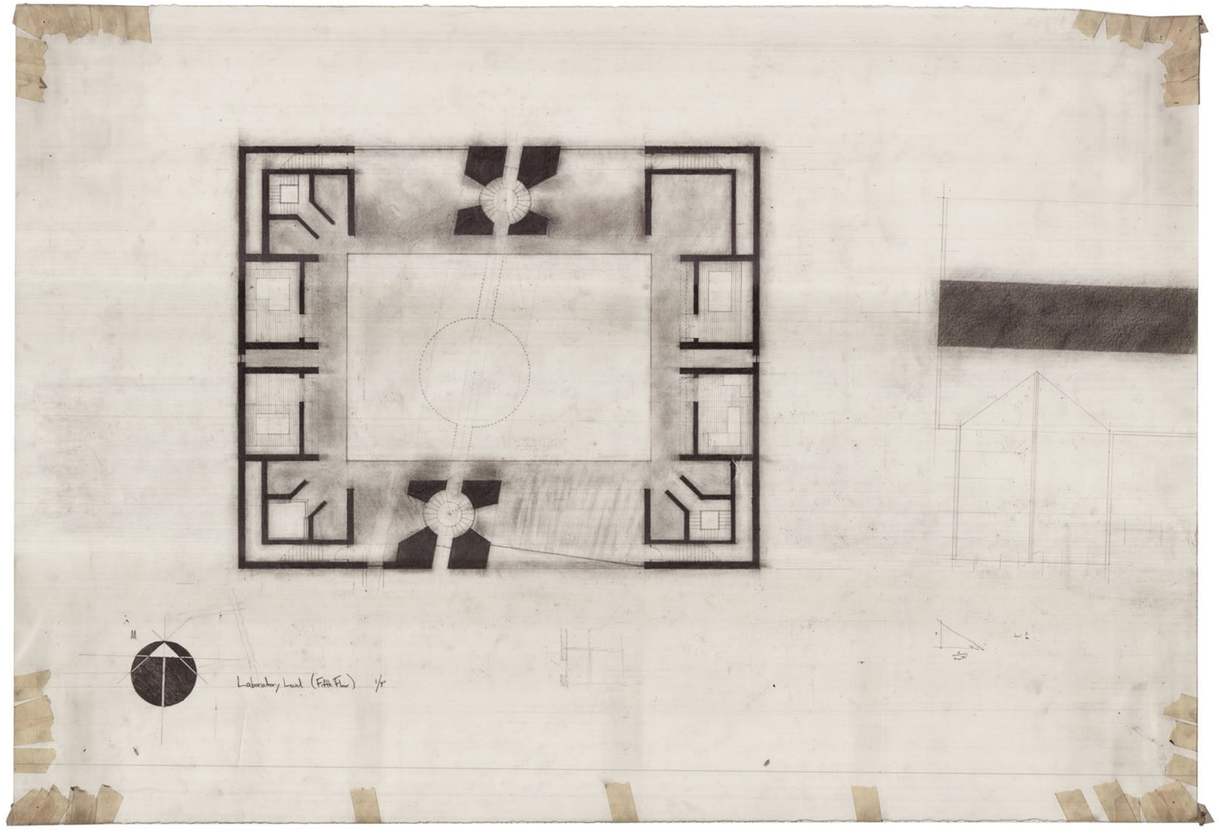

Fifth Level

Mainly home to laboratories. As this is the highest floor of the building, observation areas are provided on both the North and South sides.

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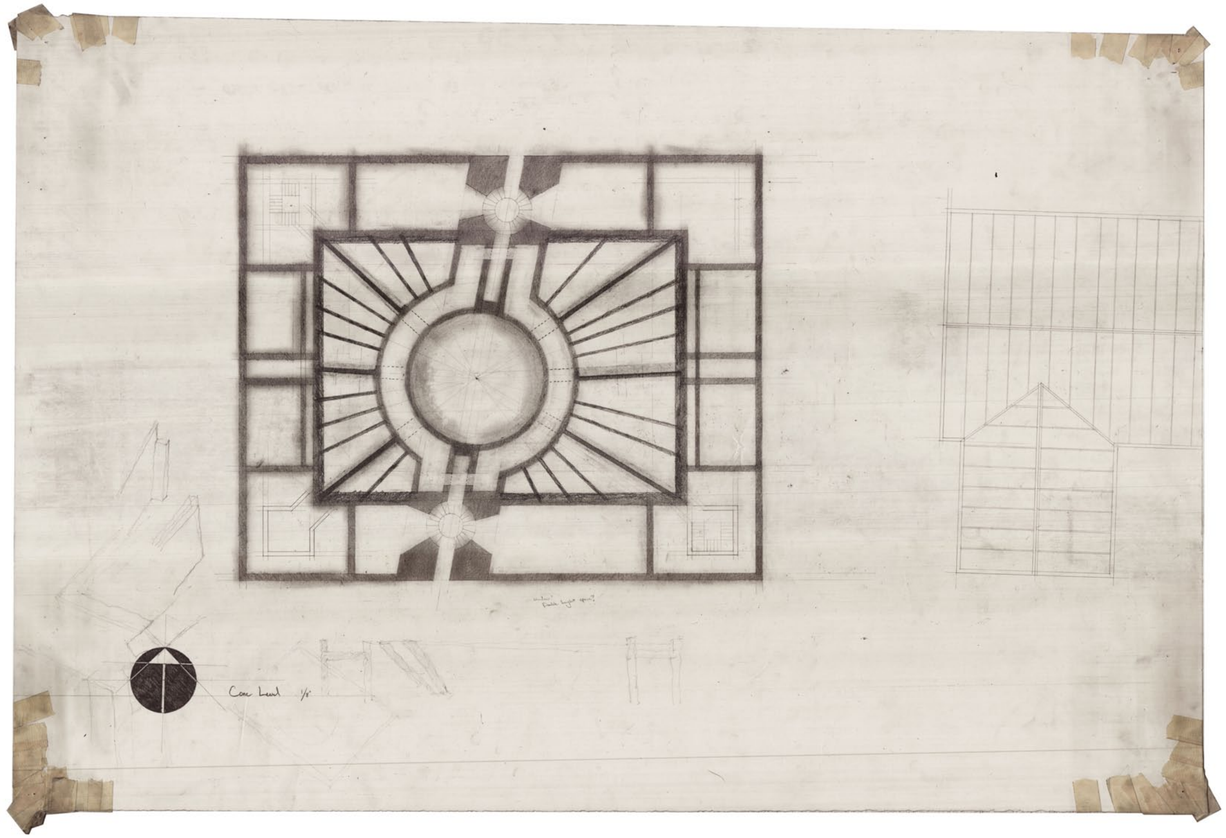

Cone Level

Largely unoccupiable, this plan reveals the structure of the cone. The cone itself is two large beams, curved near the center. Beams radiate outwards to support the roof.

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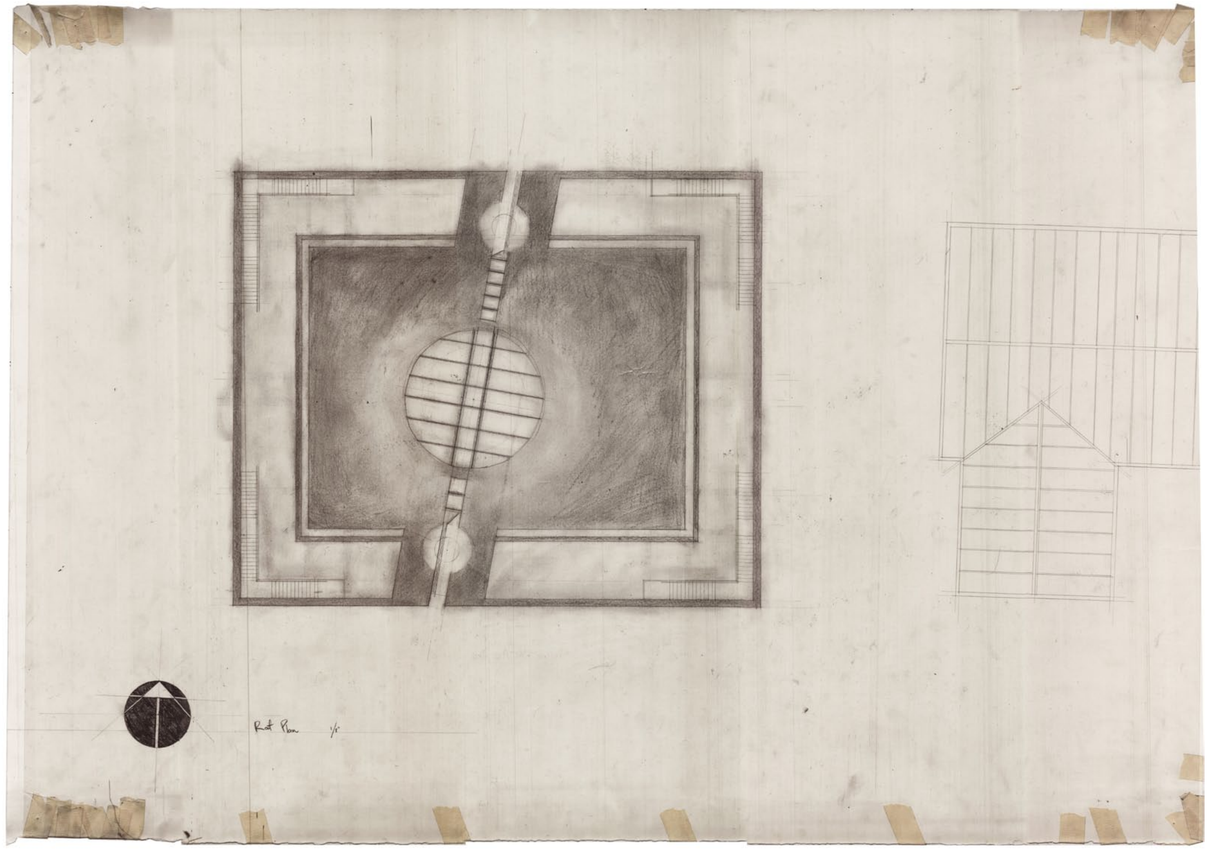

Roof Plan

Stairs lead up to the roof from the laboratory floor below. The perimeter space is occupiable, while the cone rests in the center. Glass covers the cone.

Conclusions

Every artist has an internal vocabulary, words forced into being by the desire to express. I believe the articulation of subliminal thought is one of the most authentic forces within the creative process. This internal vocabulary follows the artist like a shadow; it is an instrument or tool of the creative process. How the artist formulates his or her expressions is singular, since they are a reflection of the individual's personality; but common to all is the manipulation of intuition. These subjective translations of thoughts are part of the internal vocabulary, and it is this vocabulary that the artist leaves behind in his or her creation.[1]

Per Olaf Fjeld

[1] Fjeld, *A Pattern of Thoughts*, 107.

The goal of this thesis was to take on a notion; in this case, that of half light. That was the notion put forward by Luis Barragan:

Architects are forgetting the need of human beings for half-light, the sort of light that imposes a tranquility, in their living rooms as well as in their bedrooms.

The thesis organized itself around this notion and embarked on a series of studies so as to develop a set of intuitions concerning this notion. These studies occured through photographs, drawings, and daily observations. But most of all, the studies occured through architectural design - that is, through the process of developing a real building in a real location.

As this set of intuitions matured, there was an inherent logic about them - a logic from which a complete building would finally begin to emerge. This gave rise to the Georgetown University Center for the Study of Light.

The thought process throughout the development of the Center for the Study of Light was imbued with this notion of half light. It affected all aspects of the project - the program, the spaces, the drawings, and the studies.

To reiterate, the point of this thesis was never to "figure out" what half light is. So answering that question here at the end of the thesis is not important. While the idea itself was intriguing, the goal was more to explore a way of working: to take a single idea, develop a world around it, and to see how a piece of architecture emerges from it. The thesis was successful in that exploration. More so, it proved to be a very fruitful way of working. As long as one allows their mind to wander and to be attentive to intuitions regarding this idea, a rich world can be developed. Then from that world, a piece of architecture may be formed - something that could not have arose from any other circumstances.

Bibliography

Fjeld, Per Olaf. *Sverre Fehn: The Pattern of Thoughts*. New York: The Monacelli Press, 2009.

Frampton, Kenneth. *Labour, Work, and Architecture: Collected Essays on Architecture and Design*. London: Phaidon Press Limited, 2002.