

		A House on Saint Croix	
			

A House on Saint Croix



Karen Ann Harris Amodeo

A House on Saint Croix

A design thesis submitted to the faculty of
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirement for the degree
Masters of Architecture

Michael O'Brien
Chairman

Frank Weiner

Joseph Mashburn

Blacksburg, Virginia
December 1999



ACKNOWLEDGMENTS

This book would not be possible without the help of many people. First and foremost are my family and friends who have encouraged and supported me throughout. Their enduring confidence and faith in me gave me the courage to complete this project. They know who they are.

To my committee Mike O'Brien, Frank Weiner and Joe Mashburn whose insights and thoughts of architecture have given me a base on which to build.

Annette Burr, Donna Able and Wanda Lucas from the Art and Architecture Library in Cowgill, for their assistance in researching much of this material.

Lastly, to Catherine Porzio for her help, criticism and computer, without which this book would not have been printed.

ABSTRACT

There is an undefinable order in the universe. In our solar system, nine planets revolve around one sun. The earths' orbit around the sun takes 365 days. The moons' orbit about the earth take 30 days. The earths' revolution about its own axis takes 24 hours. The sun rises in the east and sets in the west. This is how man begins to define his portion of the universe, to distinguish limits. There is much more to explore, learn and explain. As humans we subconsciously desire a harmony and balance around us. Order. It is a physical, tangible presence that we can see, label and understand, which is evident throughout the human existence. We have a need to define, regulate and establish rules, to create order. Order permeates our lives on a daily basis.

This thesis seeks to give order to a structure, a House. It is the study of grids, columns and walls in relation to the structure that it supports. A sixteen square grid is a constant of this project. It is the controlling element that gives rise to the placement of the walls and columns. Walls and columns are placed within the house according to an order that is defined by the grid. Materials are also used to distinguish boundaries of the grid establishing its influence throughout the house.

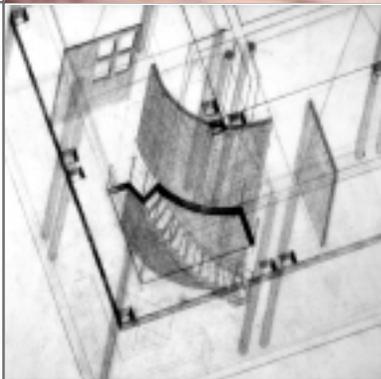
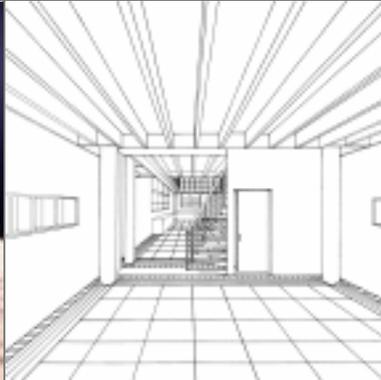


Table of Contents

vii	Dedication
ix	Abstract
3	Introduction
7	Context
25	Program
27	Studies
31	Precedents
39	The Project
75	Conclusion
77	Image Credits
79	Endnotes
81	Selected Bibliography
85	Vita

INTRODUCTION

This book gives order to both the thesis (the idea) and the project (the house).

One of the challenges that face an architect is to be able to understand the conditions of where one is building. Each site is different, climate and culture can have a direct impact on the design of the structure.

The idea is a house on Saint Croix. The statement, 'a house on Saint Croix' raises questions, what does it mean to dwell? What is necessary to dwell? Where is it necessary to dwell?

To answer these questions one has to look at the context, to understand the conditions of the site. One must comprehend and discern the culture and climate of island living on St. Croix.

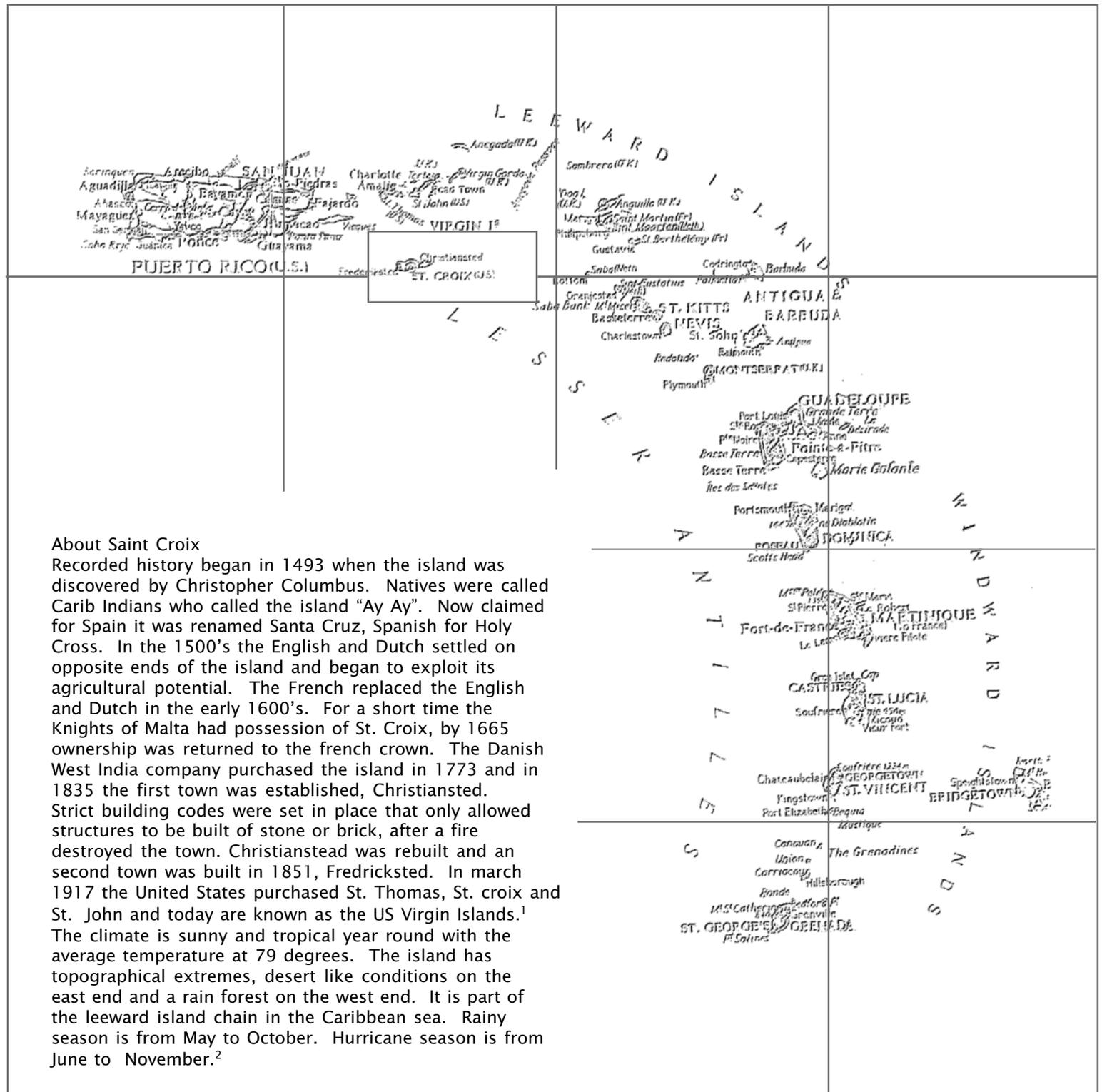
The evolution of this thesis and project has not been a linear progression, questions and answers overlap and return to ask new questions. These questions and answers have come together and form a whole.

An IDEA.

A HOUSE.

A BOOK.





About Saint Croix

Recorded history began in 1493 when the island was discovered by Christopher Columbus. Natives were called Carib Indians who called the island “Ay Ay”. Now claimed for Spain it was renamed Santa Cruz, Spanish for Holy Cross. In the 1500’s the English and Dutch settled on opposite ends of the island and began to exploit its agricultural potential. The French replaced the English and Dutch in the early 1600’s. For a short time the Knights of Malta had possession of St. Croix, by 1665 ownership was returned to the french crown. The Danish West India company purchased the island in 1773 and in 1835 the first town was established, Christiansted. Strict building codes were set in place that only allowed structures to be built of stone or brick, after a fire destroyed the town. Christianstead was rebuilt and an second town was built in 1851, Fredricksted. In march 1917 the United States purchased St. Thomas, St. croix and St. John and today are known as the US Virgin Islands.¹ The climate is sunny and tropical year round with the average temperature at 79 degrees. The island has topographical extremes, desert like conditions on the east end and a rain forest on the west end. It is part of the leeward island chain in the Caribbean sea. Rainy season is from May to October. Hurricane season is from June to November.²

CONTEXT

A hilltop,
on an island,
in the Caribbean,
United States Virgin Islands,
Saint Croix.

The site is located on the
east end of the island.
This terrain is considered
desert like.
The west end of the island
is a rain forest.

The site has a 360 view.
Water view to the north.
Water view to the south.
Hills to the west.
Higher hills to the east.



Boundaries,
not
something
that
divides,
something
that
includes,
edges.

Place,
contains
and
gathers
things.

Things,
objects
that
mark
a
way
of
life.

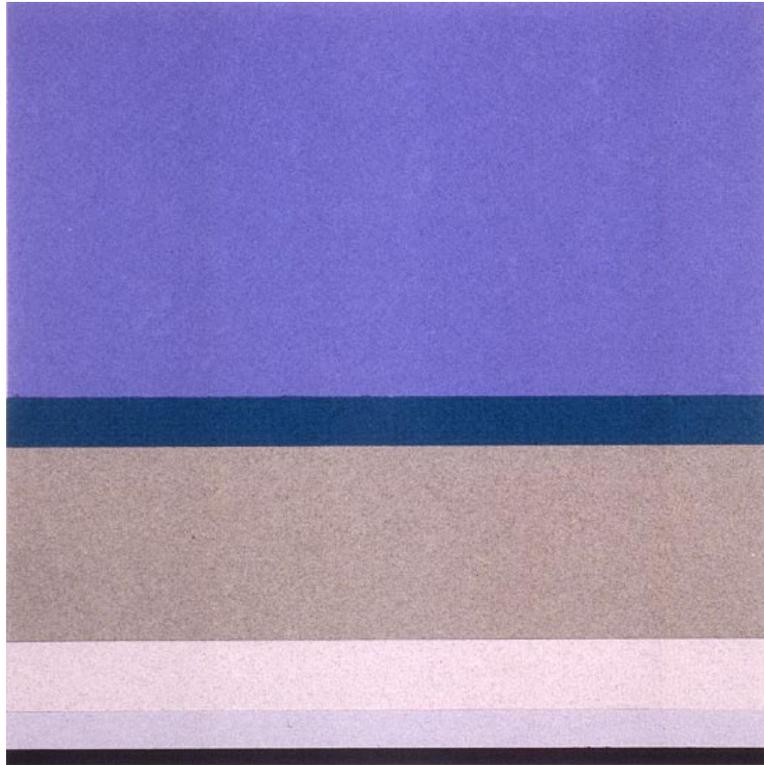
sky

water

hills

valley

site



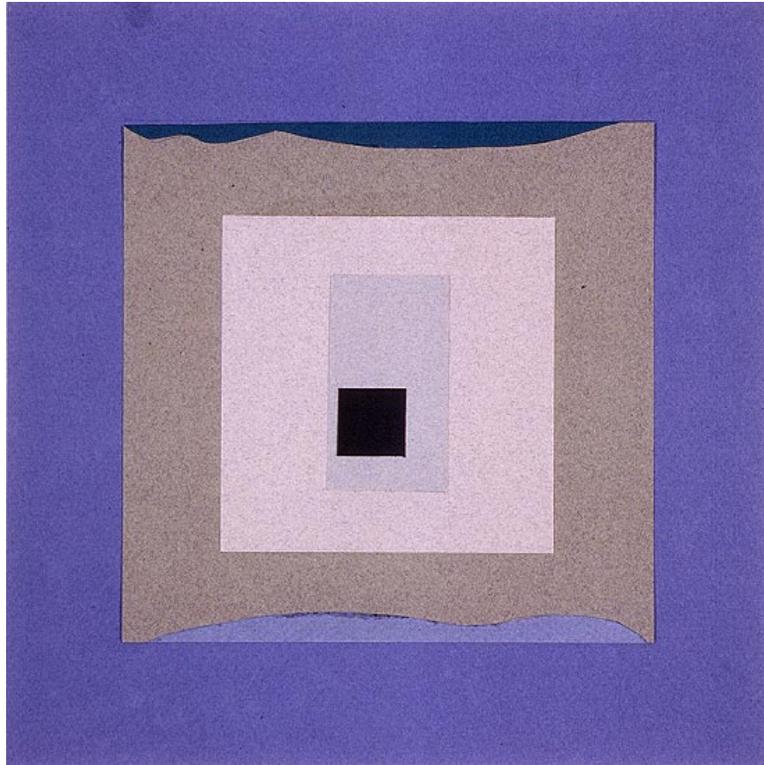
sky

water

hills

valley

site



Two walls of earth - the hills,
two walls of water - the sea,
the sky is the ceiling,
a room in the universe.

To dwell is to inhabit. To dwell in St. Croix, on a hilltop, between walls of the sea, an endless horizon, is the need to make a boundary, define an edge in a place where there is no tangible limit. A low wall establishes 'a room', it contains, gathers and holds. It allows one to inhabit the place, to be 'inside' while being 'outside'. It makes a physical boundary. It is a part of dwelling, a structure that protects, holds and contains and makes one feel secure.



Public/Private

As one approaches the house one receives a view of the public facade. As you enter, it becomes apparent that you are entering a more private realm. The landscape opens up and one is faced with a variety of layers. A pool is encountered, beyond a low wall that acts as a physical boundary and encloses an outdoor room. Past this wall is more land, then water and sky meet to form the horizon. Endless, yet a definitive boundary.

An invitation into a more private area is encountered as one enters into the house. The main living area is on the first floor, the curved wall, a transition element, moves one horizontally from a public to a private space. The vertical transition also moves one to the more private areas of the house, the bedrooms.

The move from public to private areas is a transition that begins from the moment one enters through the main portal. It is a formal movement, like a snail pulling itself into its shell, seeking protection from the outside world. A safe place, a haven.

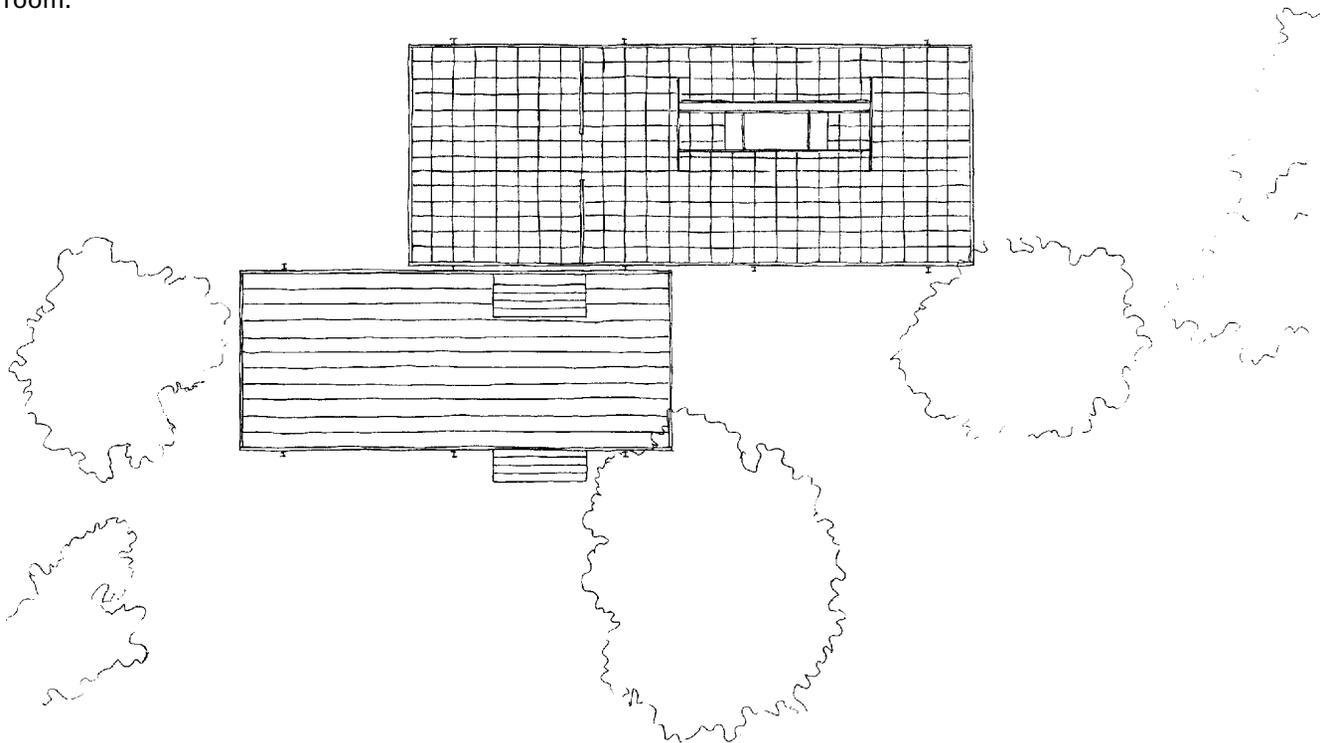


PROGRAM

This project is a house and a guest house, a pool and an area to sit outside protected from the sun. The essence of 'house', the spirit of 'house' as opposed to the institution of 'house', is a haven. A place to isolated from the outside world. One is invited in through the portal into a more private world. A large outdoor room, a place that is defined by low walls creating boundaries.

The Greeks and Romans had courtyards, they were contained within the house itself. The main purpose of the courtyard was to provide water and light for the interior of the house, but it also served as a place to gather protected from the noise of the street.

A more modern example of a house with an outdoor room is the Farnsworth House by Mies Van der Rohe. The patio, elevated from the ground is seen more as belonging to the house than to the land. In plan it is clearly read as part of the house. While there are no walls that mark the boundary of the patio, visually the landscape becomes the walls of this room.



STUDIES

Division of a whole.

How do you divide a whole?

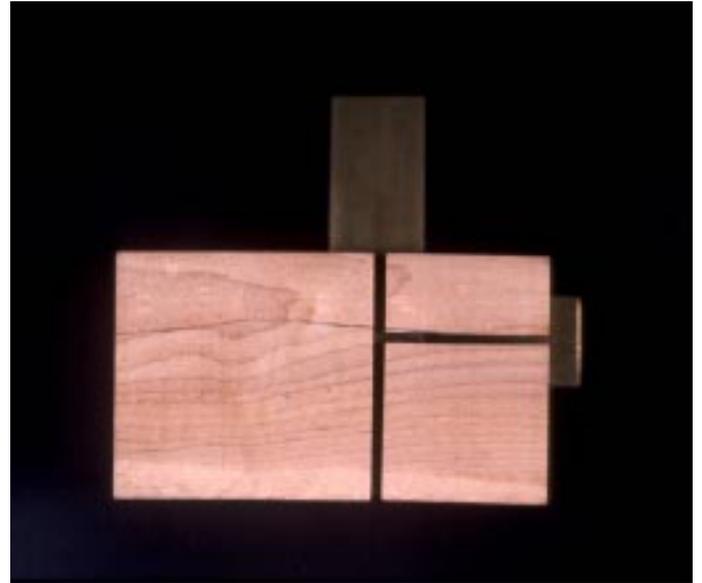
What are the relationship of parts to the whole?

How do you rejoin these pieces?

What is the new relationship of the parts?

These questions led to a study model using both wood and metal. The piece of maple was divided and rejoined by a bar of brass. As the parts were reassembled their relationship to the whole was reassessed.

This studied generated a search for order.

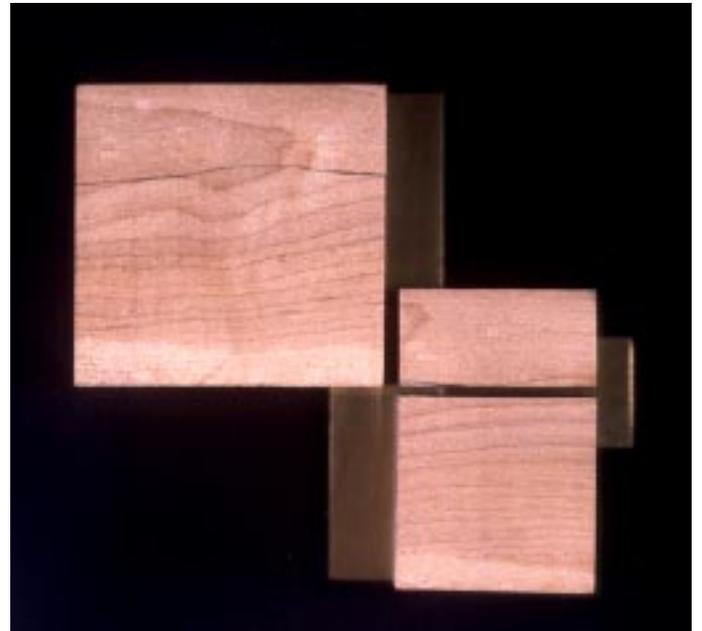


Order -pertains not only to things that are, but also to things that are not yet.

Order -is ultimately beyond description.

Simply, "order is".³

Louis I. Kahn



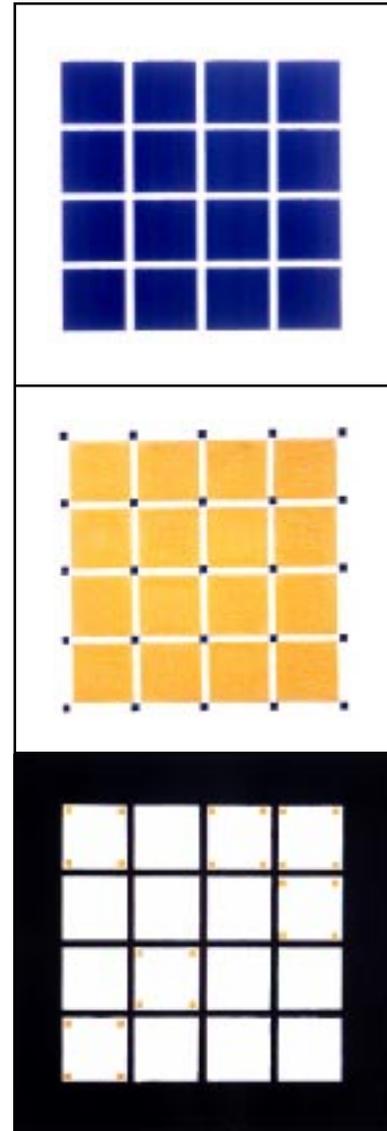
How can order be established?
How can it be maintained throughout?
In this project the grid became the organizing principle, and the square became the defining unit.

When using a grid, what happens to the walls?
Do they exist within the grid or do they exist on the grid?

The idea of grid, is this seen as one square? A whole? Or is it seen as sixteen individual squares?

What happens when columns are introduced at the points of intersection on the grid? Do they become part of the walls? Can they stand on their own or do they blend in with the existing order and have no life of their own?

A more complex statement about walls and columns is the introduction of a second grid, of columns, independent of the first but contained within it.



PRECEDENTS

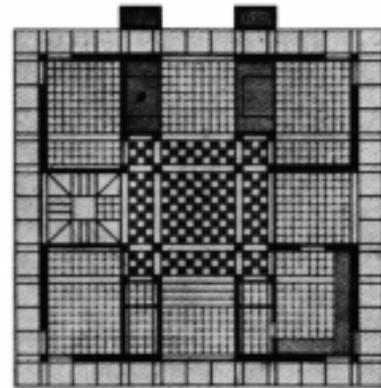
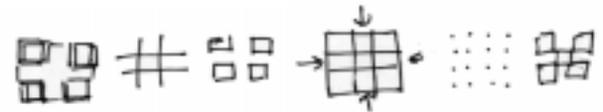
In order to further explore the idea of grid it becomes imperative to define the basic operational unit, the square and how it is used.

A square represents the pure and rational. Rational meaning capable of being expressed exactly by a ratio of 1:1. It is static and neutral. A square is non hierarchical and non directional.⁴

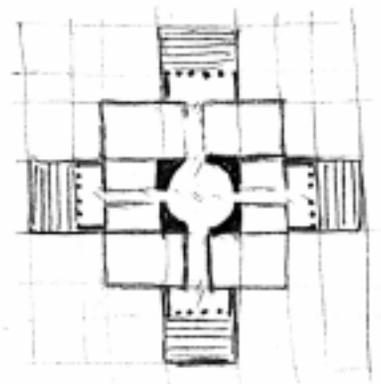
A grid can be defined as two or more intersecting sets of regularly spaced parallel points where lines intersect. The organizing power of the grid results from the regularity and continuity of its pattern the pervades the element that it is organizing. Its pattern can establish a constant field of reference points in space.⁵

There are a number of ways of establishing a grid. Here I have explored three possibilities and examples of each. The first is a four square grid. In the early 1900's, prior to the depression many houses were built that used a four square grid. It was a house with two floors and four equal size rooms on each floor. This type of plan was seen as too limiting for the architects of the time.

Another possibility is the nine square grid. The Casa Tonini by Bruno Reichlin and Fabio Reinhart is an example of this. The walls in this house are placed on the 'grid line'. By removing walls from the center square, two corridors are formed that link the four rooms on the ground floor. There is a symmetry on either side of the central hall in either direction. Andrea Palladio's villa Rotonda is a more complex nine square. The central square becomes a circle. The space between the circle and the orthogonal grid serves vertical circulation. Horizontal circulation occurs through openings in the circle. The center square of both the casa tonini and la rotonda are paid homage by remaining open to the second floor and marked by a dome in the latter and a clearstory in the former.



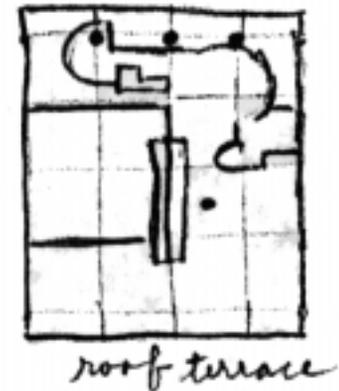
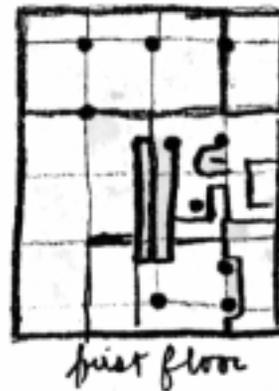
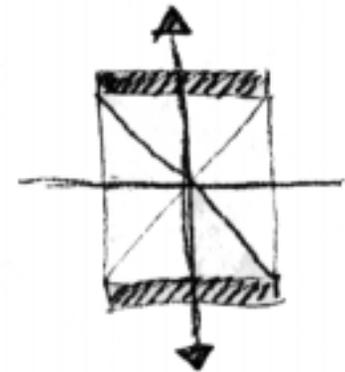
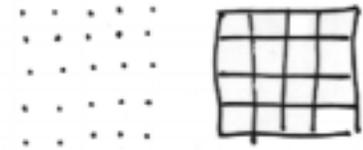
Casa Tonini



Villa Rotonda

An example of a sixteen square grid is the Villa Savoye by Corbusier. The plan is based on sixteen squares which is given a dominant axis by the extension of the grid at its ends. To further mark the dominant axis, a ramp straddles the center line of the square. This ramp begins on the ground floor and continues up to the roof terrace, thus making the dominant axis visible on every level. Pilotis mark the grids intersecting points. These columns allow the placement of walls anywhere, inside, outside or on the grid, as desired. There are places where Corbusier breaks his own rule and moves pilotis off the grid, however this does not appear to diminish the evidence of 'grid'.

This thesis is a sixteen square grid. While the entire square is not enclosed by a formal structure, boundaries are delineated by walls that mark the edges of the "house".



Villa Savoye

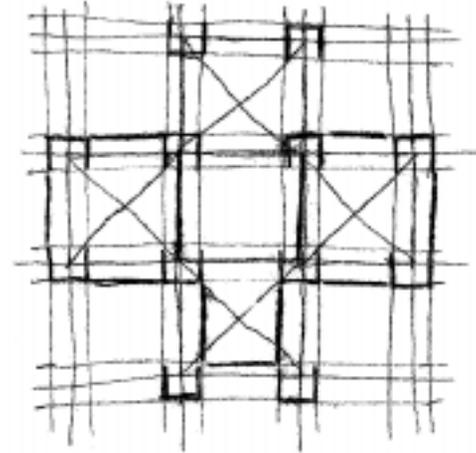
Wall

Luis Barragan's house as described by Emilio Ambasz, "is at once a garden and a house, inextricably bound together."⁶ The walls enclose the house and the landscape around the house, joining the two. House and garden become linked.

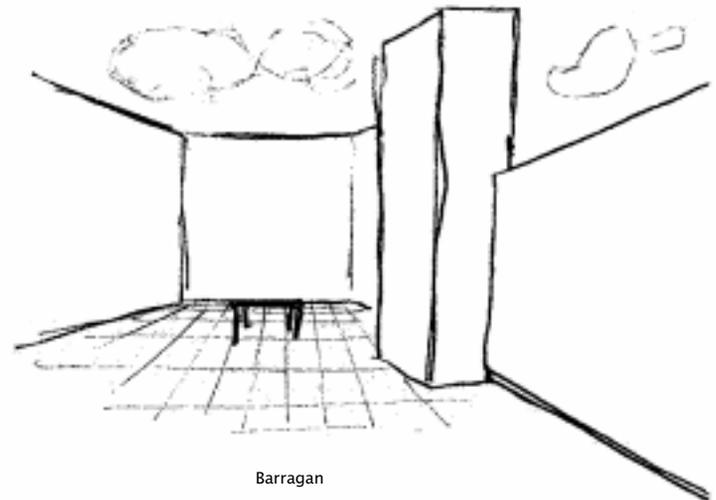
The Farnsworth house, by Mies Van der Rohe, embraces its surroundings and invites the outside in. Boundaries of the house are not marked by the glass walls but the elevated floor, which extends past the glass out to the patio. The 'house' is perceived as the enclosed structure and the open patio space. Physical boundaries of the Farnsworth house are the man made structure. Nature, trees and shrubs become a secondary wall that encloses the house.

The walls of the Barcelona Pavilion, by Mies and the Villa Savoye, by Le Corbusier are non load bearing structures. The walls here respond to the program of the building.

The Trenton Bath House, by Luis Kahn is a key point of transition in his work. Kahn said of this project, "if the world discovered me after the Richards Tower Building, I discovered myself after designing that little bath house in Trenton."⁷ The building has a visual clarity. Each functional unit is distinctly defined by its own structural volume. The walls enclose and define boundaries.



Trenton Bath House



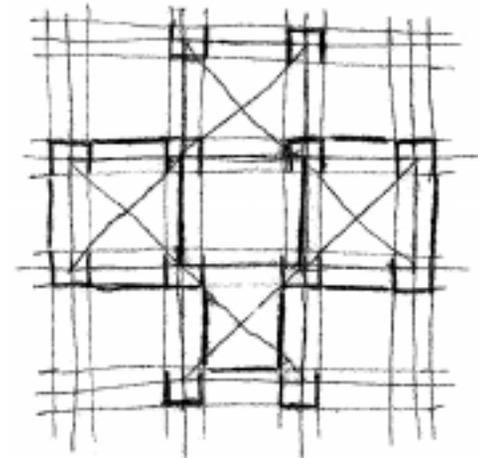
Barragan

Column

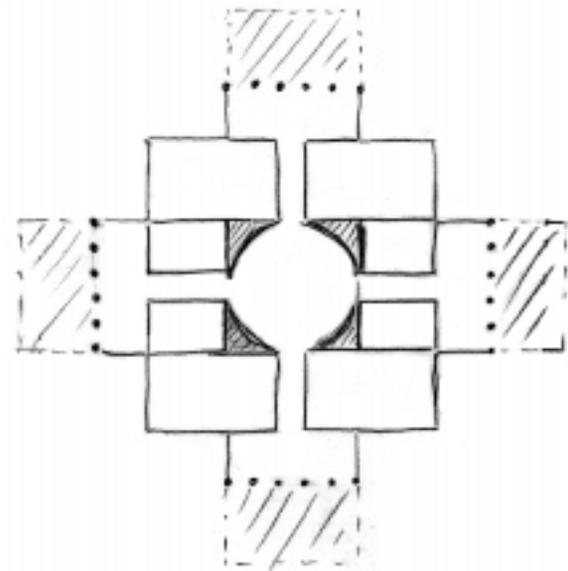
Columns are vertical linear elements in architecture. They can be used literally as structural elements or figuratively to establish points in space.

For Andrea Palladio the column is an important element in his work. There are four conditions of 'column' that he recognizes. A column stands alone to support the roof. This can be seen in the Villa Rotonda, six columns stand at the entrance of each portico. The second, the column is part of the wall. An example of this is in the Basilica on Vicenza, columns are used to regulate the horizontal space by vertically dividing the facade. This is called an engaged column, this may occur on the facade of the wall or at the end of the wall, as in the case of the Villa Sarego. The last condition of column is one that is used in the Villa Valmarana, two columns are placed between the wall. They mark the entrance of the building but are read as part of the wall without actually being physically joined to the wall.

The Trenton Bath House by Kahn, columns are used as 'servant' spaces. The columns are eight foot by eight foot hollowed out squares, which contain bathrooms, storage spaces or act as vestibules. The roof of each unit rests on the columns. The columns serve to support the roof, the walls function is to enclose and define the boundaries.



Trenton Bath House



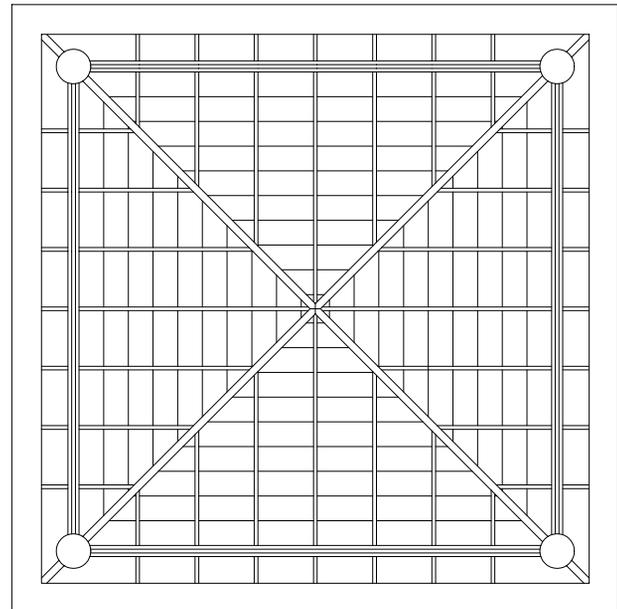
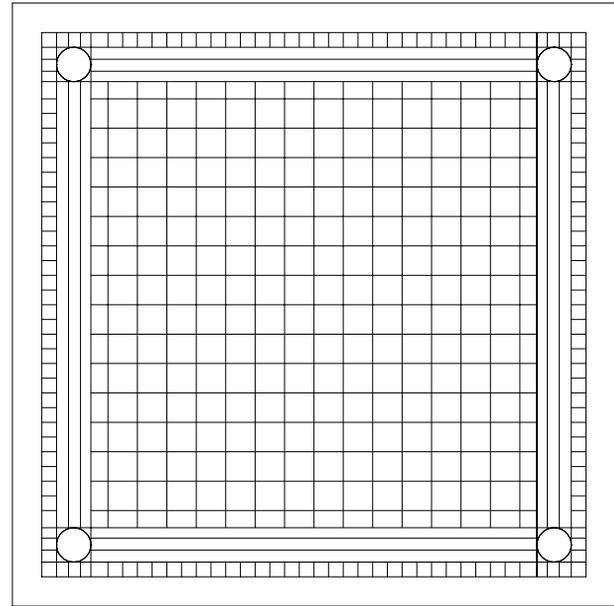
Villa Rotonda

THE PROJECT

The idea of grid is acknowledged throughout the house. Both the floor plan and the reflected ceiling plan recognize the different zones by changes in material.

In the floor plan the place between wall and column is tile. The area between the columns is wood and the center of the room changes back to tile of a different scale.

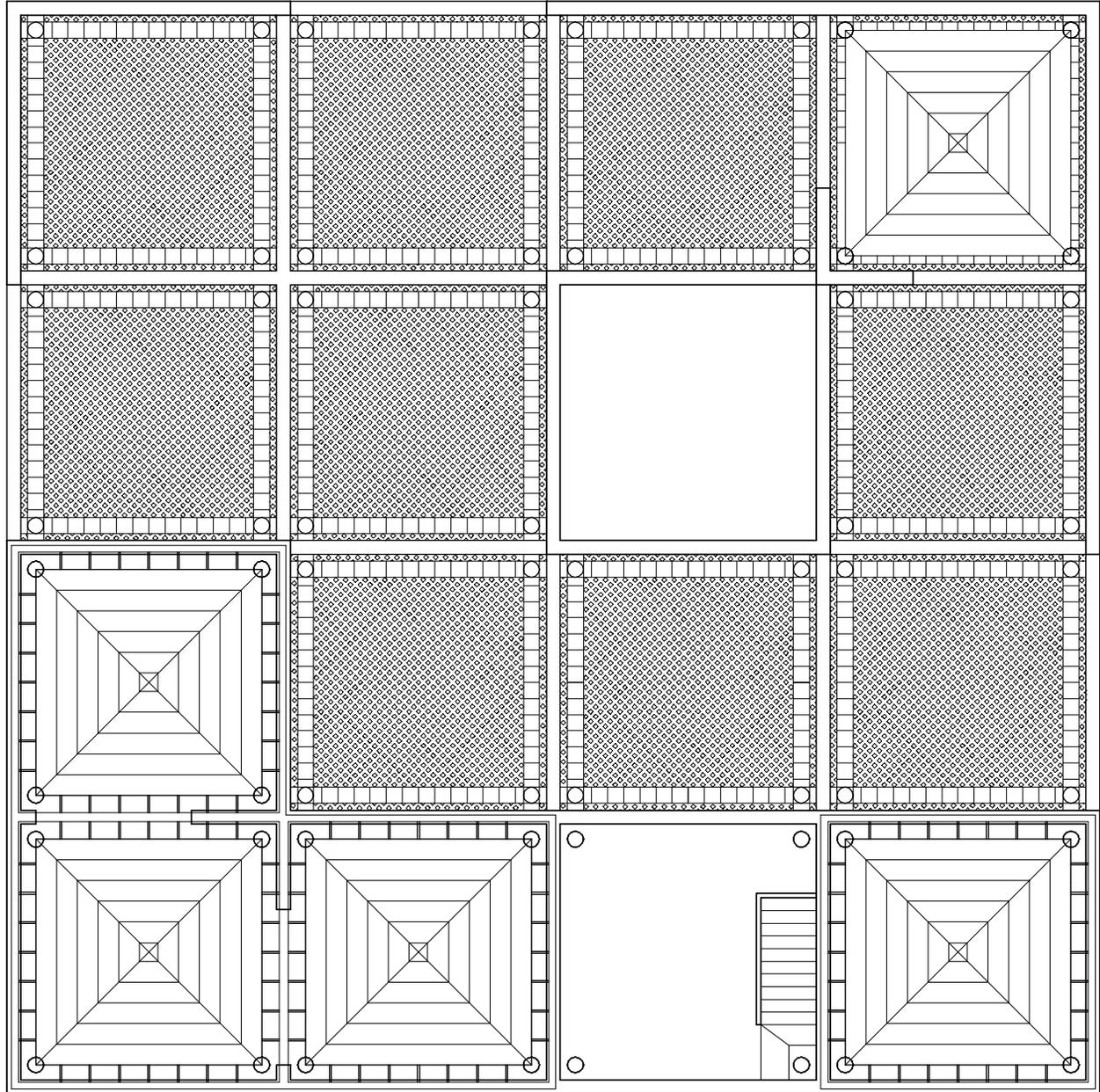
In the reflected ceiling plan the place between column and wall is glass. The place between the columns supporting wood beams, and the center is the exposed structure of the roof.



To continue with the idea of acknowledging the grid, it had to be apparent outside as well as inside. The original grid line is continuous concrete, the column grid line is fourteen inch block and the open areas of the grid are pavers. The effect of the pavers is that of a carpet for outdoors. It establishes its own pattern woven into the earth, defined by the grid.

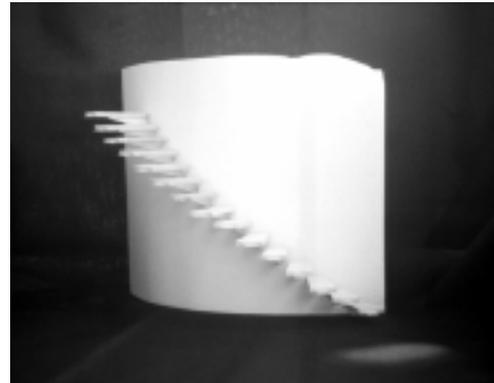
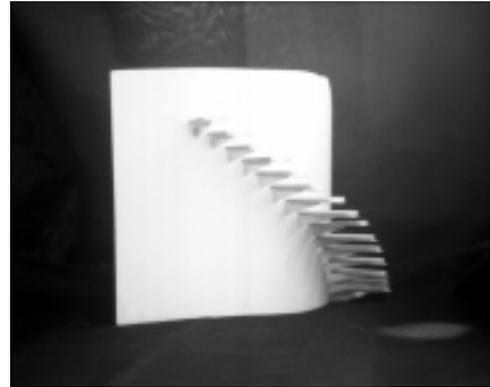


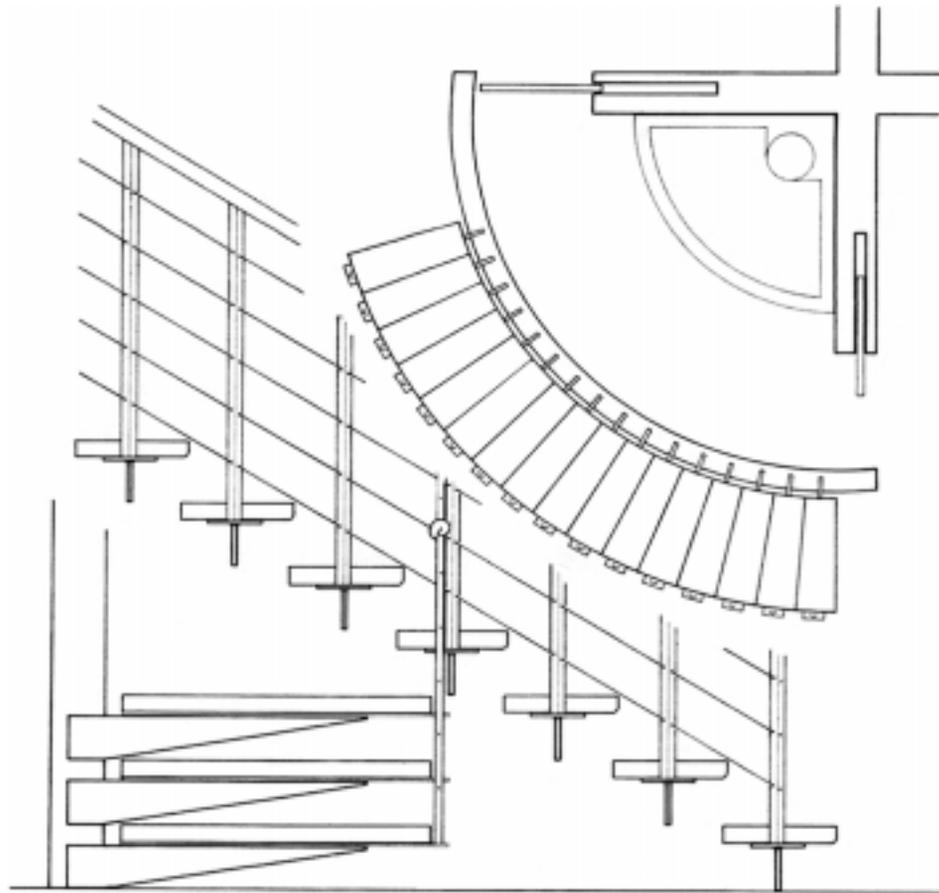
south



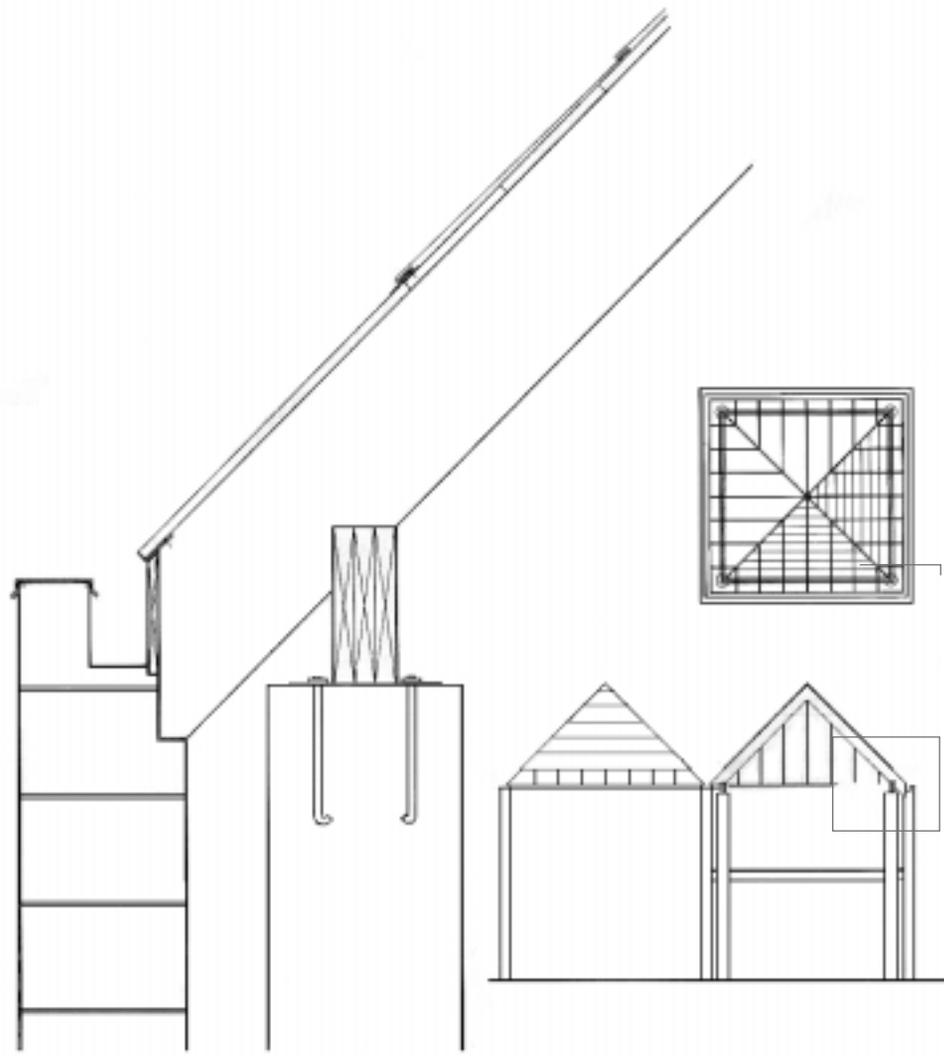
north

In this detail drawing of the stair, the curved wall is one quarter circle that has its center point where the two walls of the house intersect. In the elevation, the stair tread is pulled away from the wall, it can be read as part of the wall but still remain independent of it.



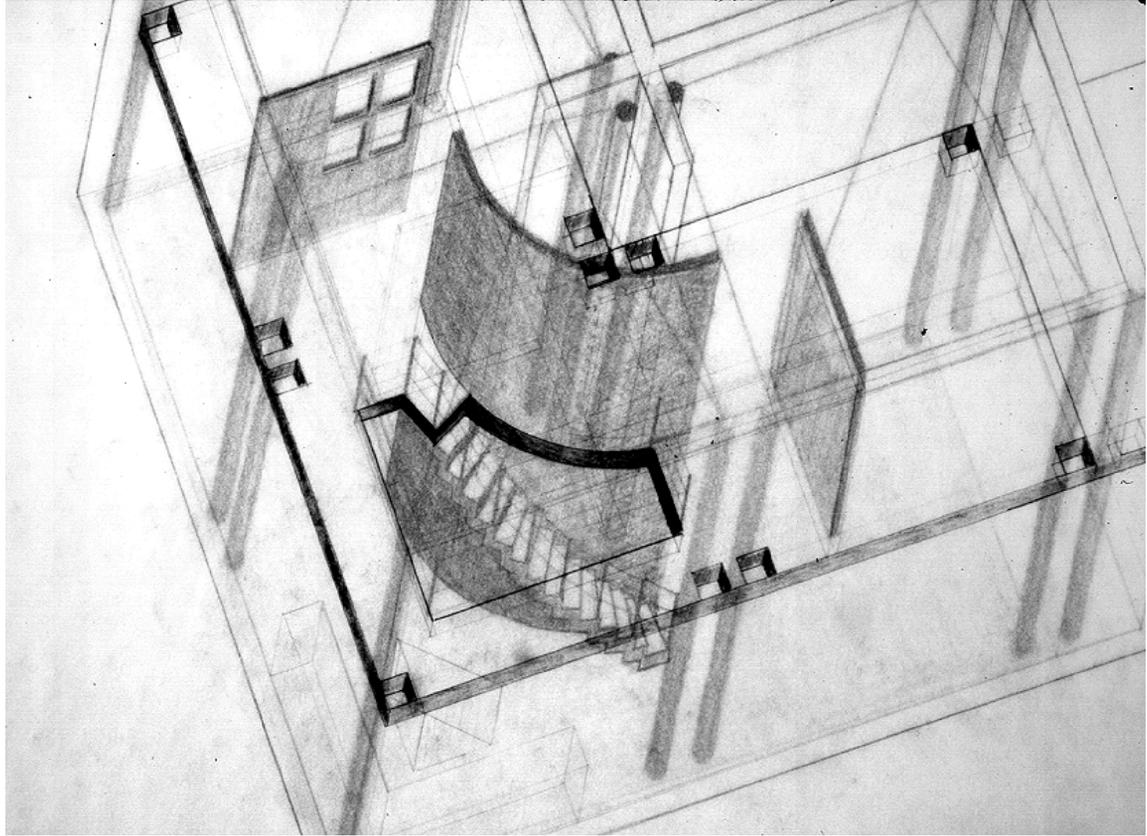


In this detail drawing of wall, column and roof one can see how they relate to one another. The column is pulled away from the wall, the roof rests on the column, and the roof connects column to the wall. As light enters through the roof it is reflected from the beam back to the wall. From the place between column and wall one can see the rain as it flows down from the roof into the gutter. The gutters downspout is within the wall and carries the water down to the cistern.





Axon A clearly defined the volume of space. The columns penetrate the second floor and stand on their own. The curved wall moves one around the corner of the house. It is a strong visual element in itself, extending from the first to second floor.



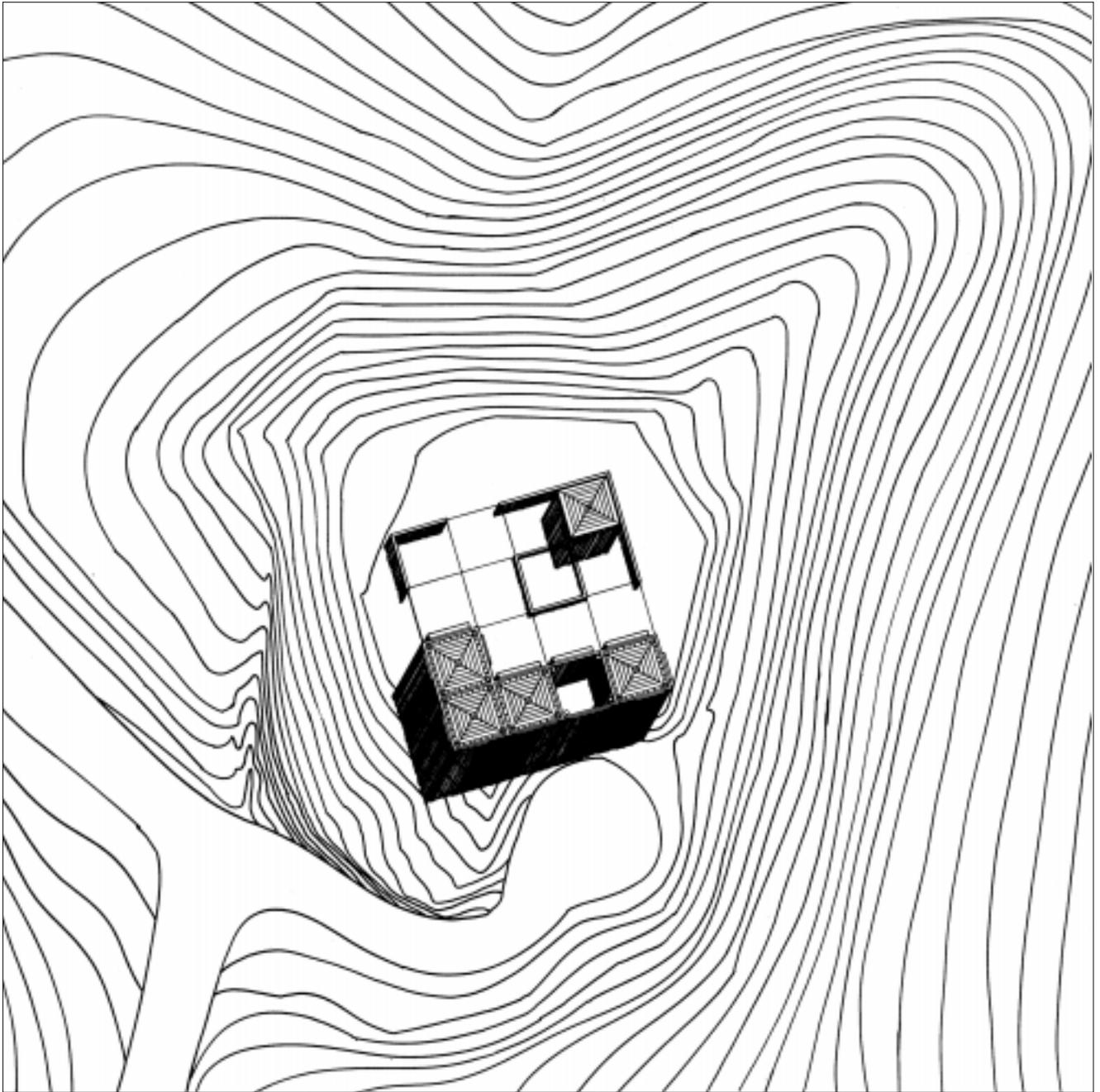


Site Plan

The placement of the house on the site does not run directly north/south. It is placed at an angle in response to the conditions of the site. The prevailing wind is from the north east, angling the house gives a greater exposure to more surface areas with windows and keeps the house cool without air-conditioning. The main body of the house also protects the pool from the wind. The sun and wind together cause water to evaporate quickly, and water is a precious and expensive commodity in the Caribbean.



south

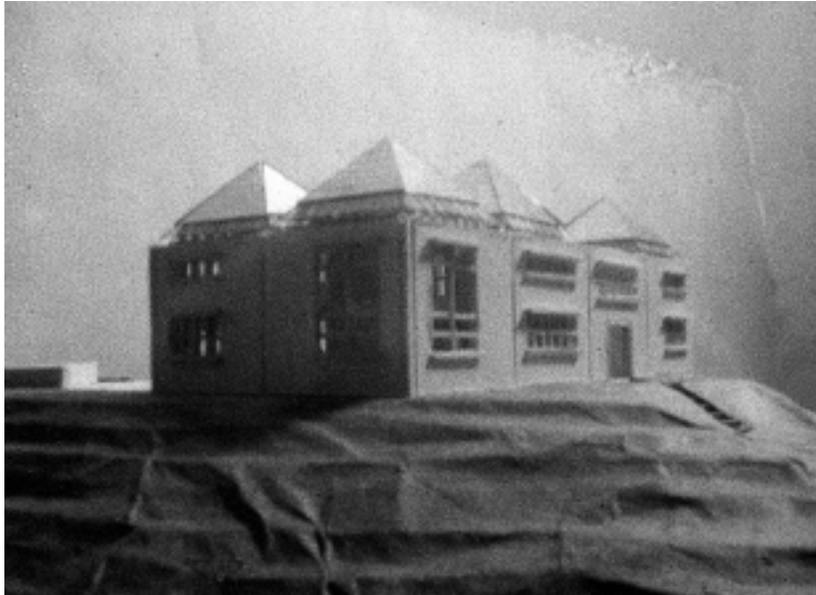


north



East Elevation The windows have their own order. They respond to the site. They pull the eye horizontally rather than vertically. The corner window in the east elevation extends from the first floor to the second floor. Its order, while in keeping with the other windows, responds to the house and its interior.





North Elevation

As with the east elevation, the north elevation has a large first to second floor window. This is the fulcrum of the house. These windows on the corner indicate that this section is different and acknowledges it, a place where a transition occurs.

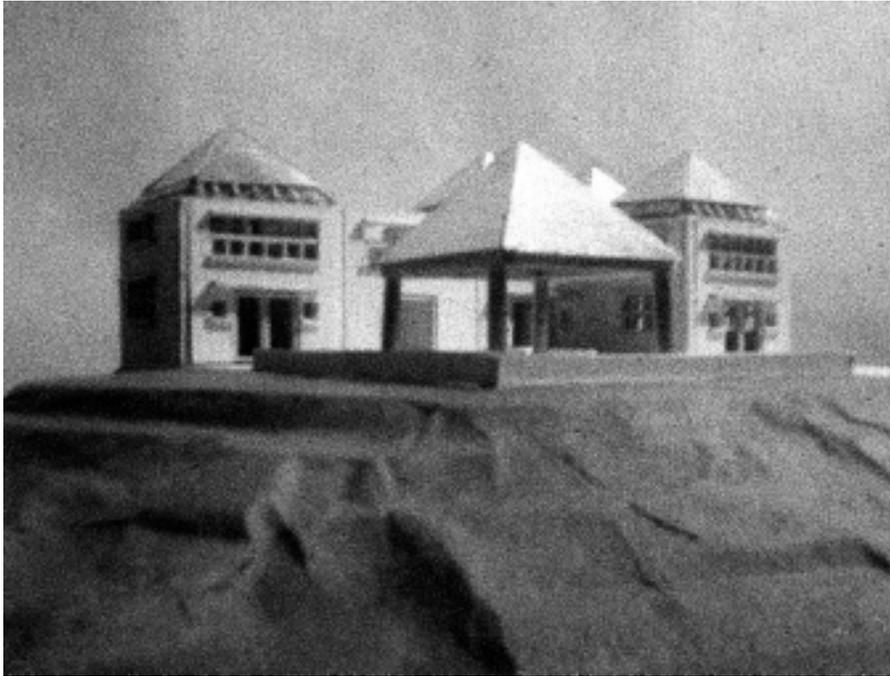




West Elevation

In the Caribbean the sun is more intense and constant. There are twelve hours of sunlight during the day, from 6 AM to 6 PM. Many of the houses on St. Croix use shutters to block the sun. Some have two sets of shutters, places that are air conditioned frequently use glass as the interior shutter, while places that don't have louvered interior shutters (these allow for the breeze to enter while at the same time keeping the heat of the sun out). One of the challenges here was to maintain a view, but at the same time minimize the amount of direct sunlight and heat entering the house. An effective solution is a series of two foot square windows. The depth of the windows is the thickness of the wall. The wall acts as a brisolei, keeping direct sunlight from entering the room. The view is maintained.





South Elevation

Above each window is another shading device, they extend out eight inches. The same device is located above each of the doorways and the depth is increased by two feet. This along with the thickness of the walls (approximately thirteen inches) effectively keeps the glare of the sun to a minimum. Aesthetically the extended shading device offers the facade of the building some relief.

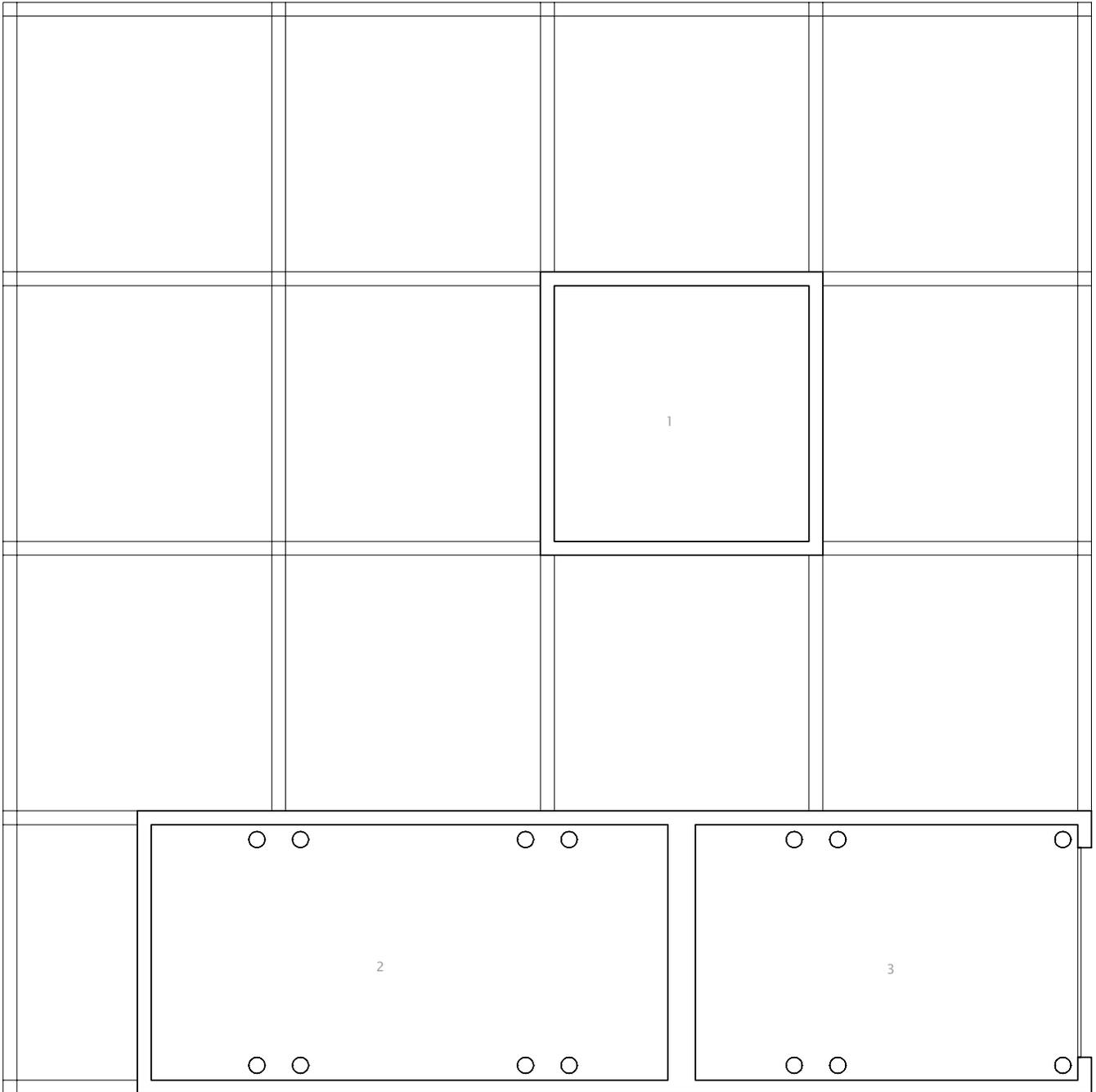


1. Pool
2. Cistern
3. Garage



Ground Floor Plan

south



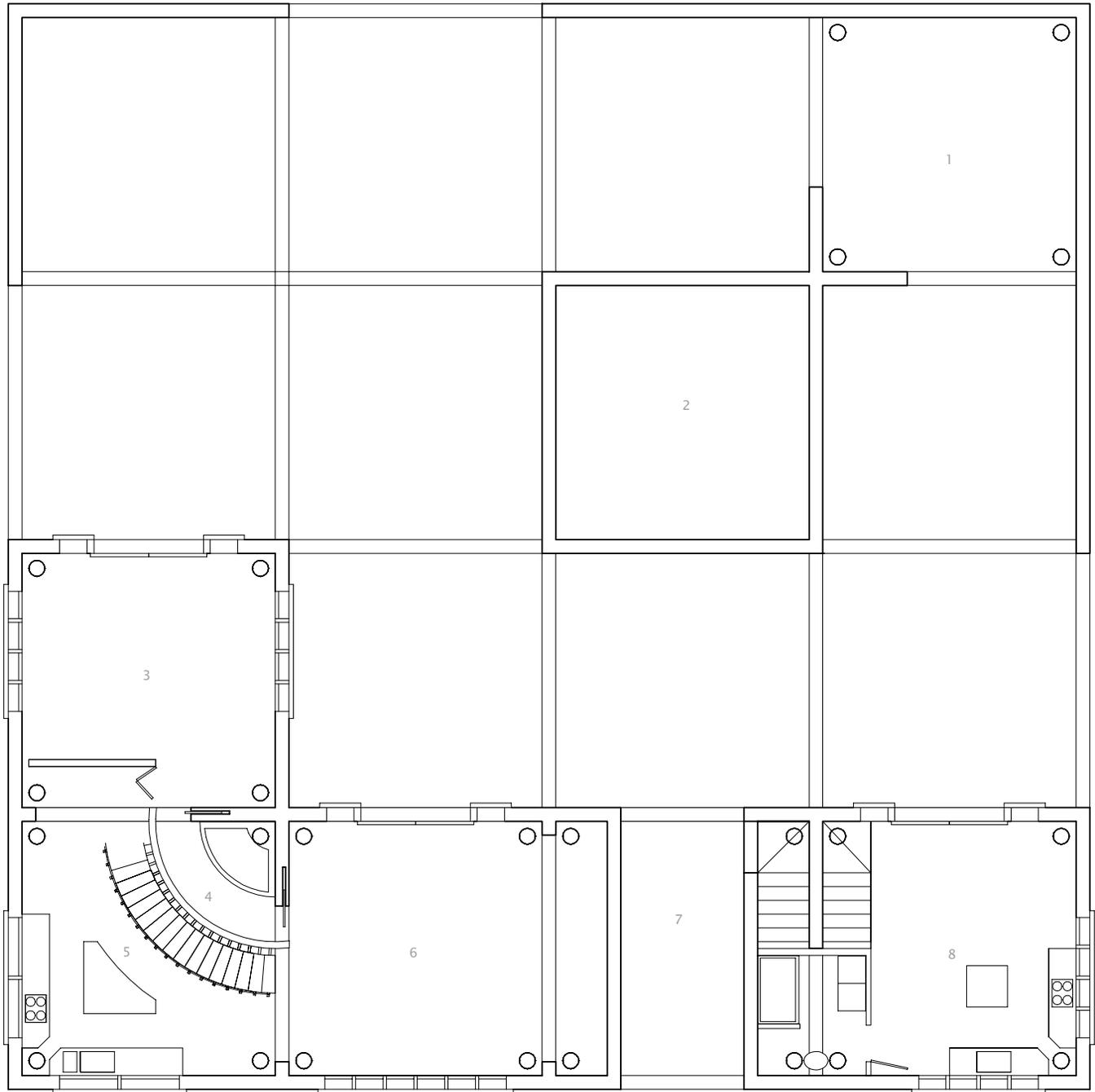
north

1. Gazebo
2. Pool
3. Bedroom
4. Bathroom
5. Kitchen
6. Living Room
7. Entrance "tunnel"
8. Living Room / Kitchen
9. Bathroom

First Floor Plan

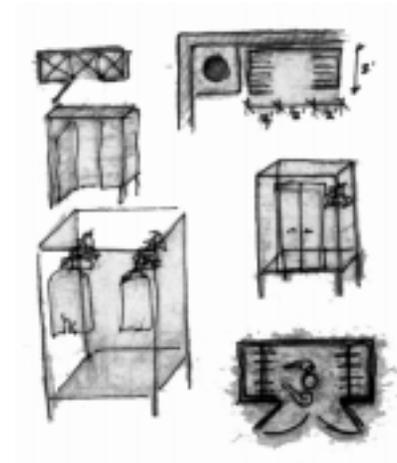
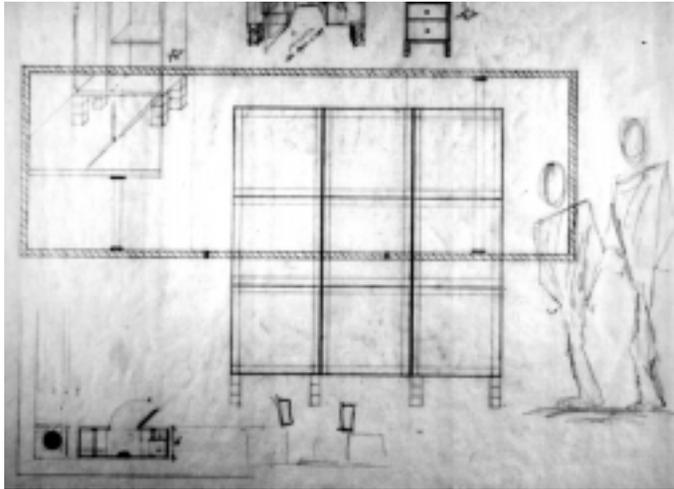
The entrance to the house is the passage through the main house (on the left) and the guest house (on the right). As you enter the guest house, the main living area is on the first floor. The kitchen and living room are combined and the bathroom is tucked away under the stairs. Entering into the main house you first encounter the living room, this adjoins the kitchen. It is in this corner of the house that the grid is broken. There is a curved wall, that acts as a transitional element. A curve defers to movement. The movement here is both horizontal and vertical, movement which goes from public to private. The wall itself moves around the kitchen through to the back bedroom. The stairs pull one up and around to the upstairs bedrooms.

south



north

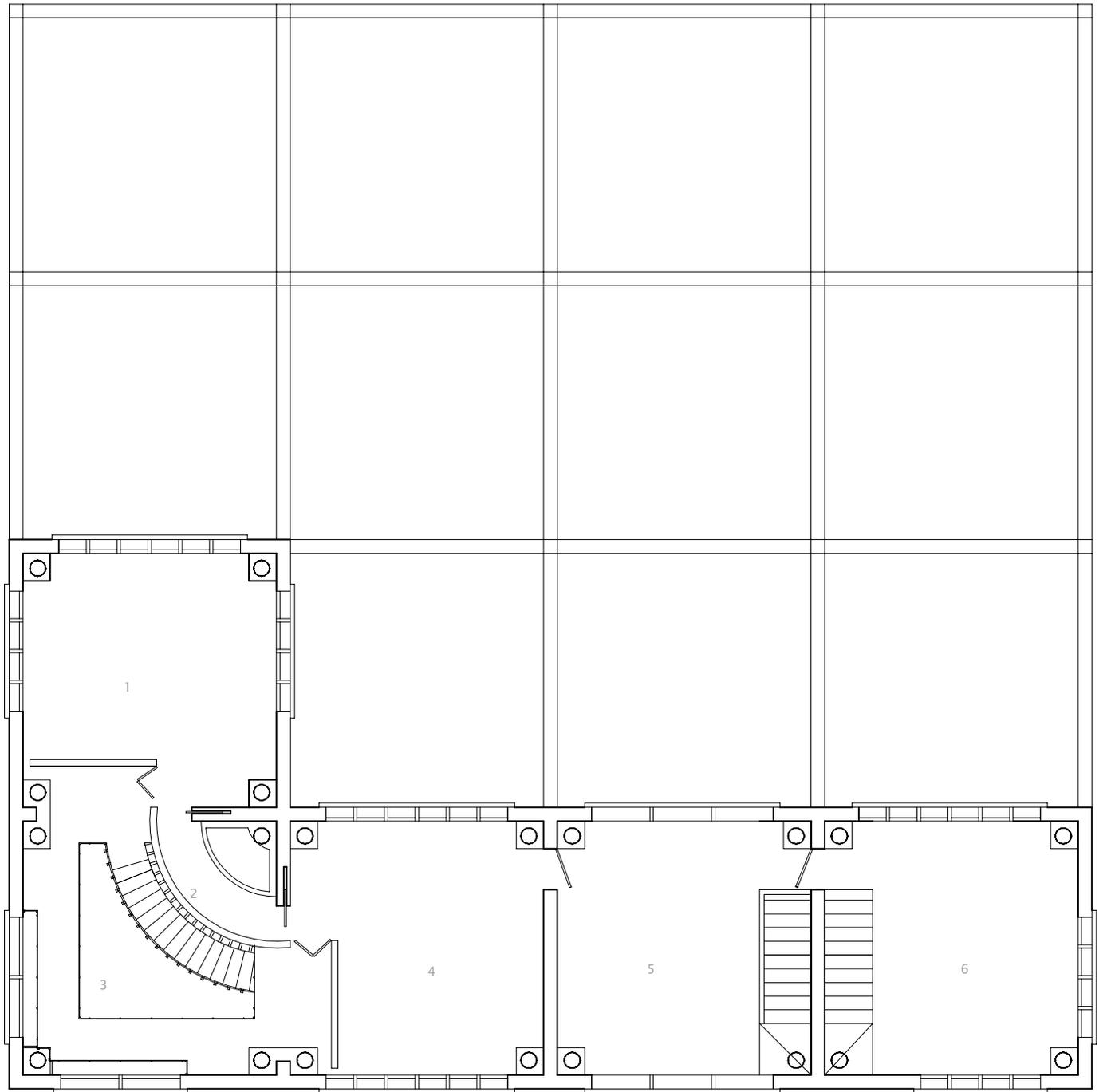
1. Bedroom
2. Bathroom
3. Open to below
4. Bedroom
5. Open Terrace
6. Bedroom (Guest House)



Second Floor Plan

On the second floor the main house and guest house are reunited by an open terrace. There are stairs from the passage that lead one up to this more private space. The upstairs of both houses are the bedrooms. One of the difficulties of working within the organization of a grid is that it becomes hard to break the established order. Given this thought, instead of trying to force closets into this organization i began to think of furniture to fill the need for storage. An amoire would serve as a closet. Its principle of design organized in a way similar to that of the house, giving it a relationship to the house.

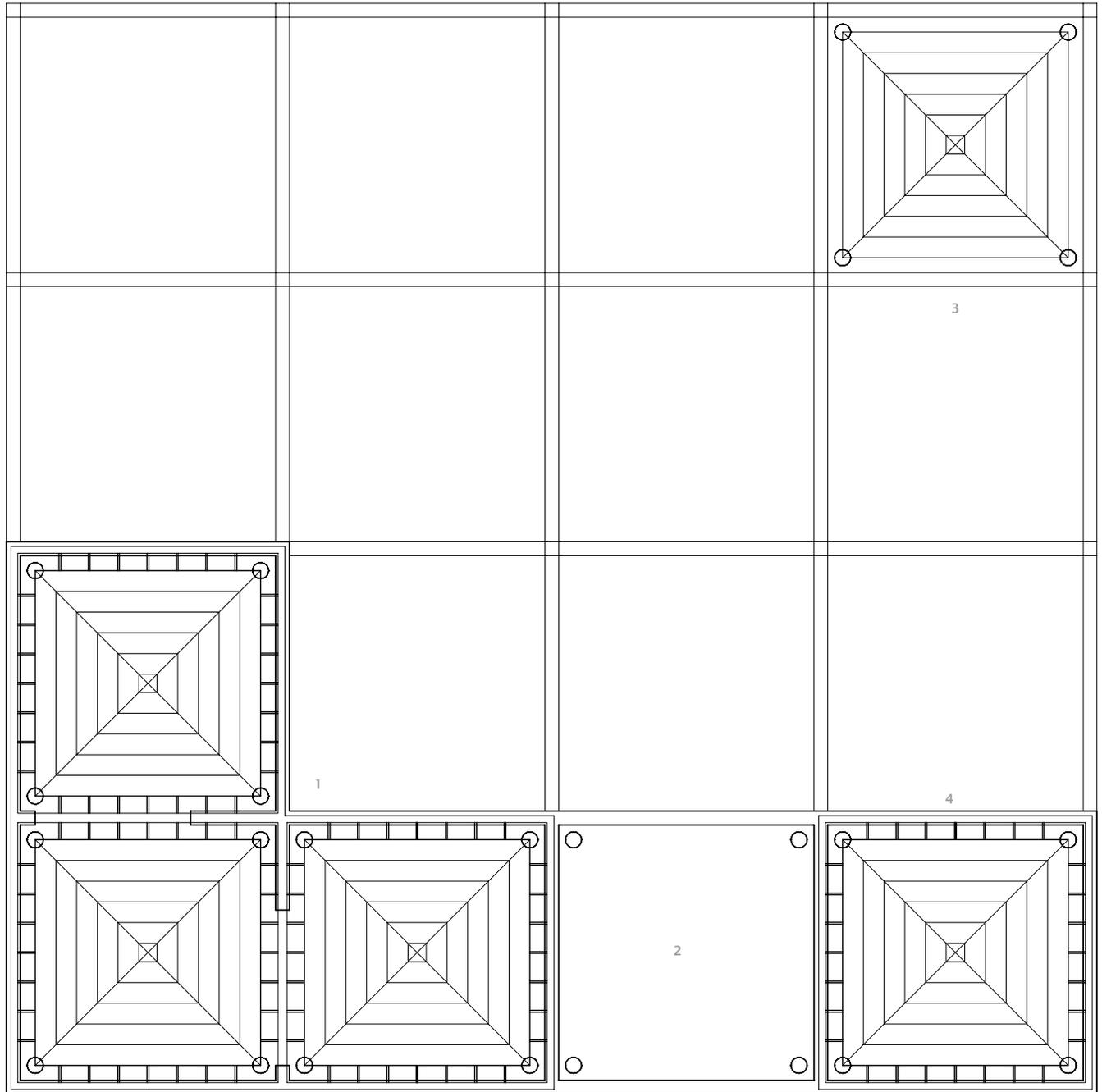
south



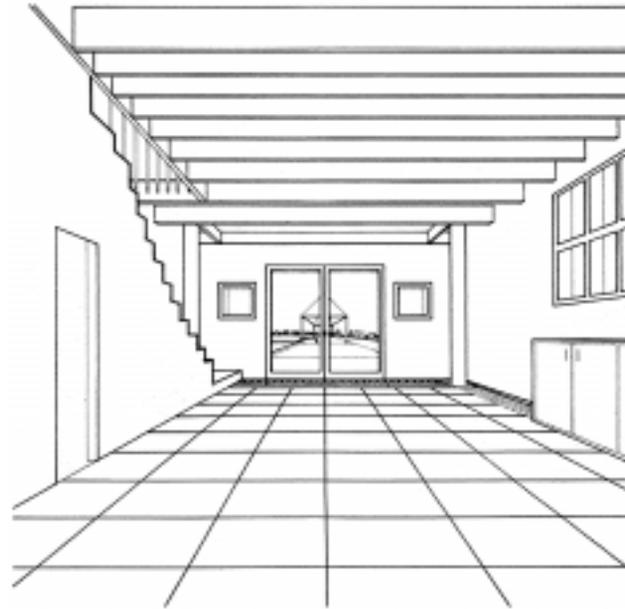
north

1. Main House
2. Open Terrace
3. Gazebo
4. Guest House

Roof Plan



1. Main House
2. Guest House
3. Open Terrace
4. Entrance "tunnel"

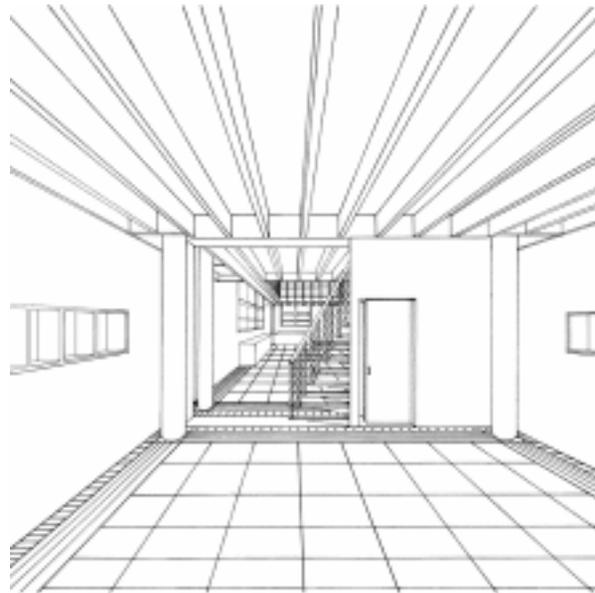


East West Section

View from Guest House looking South

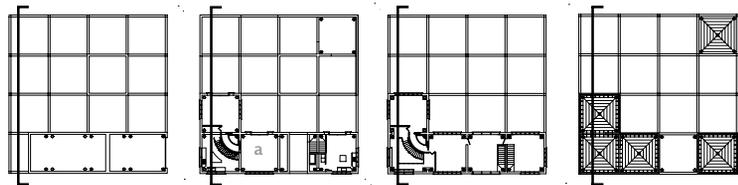
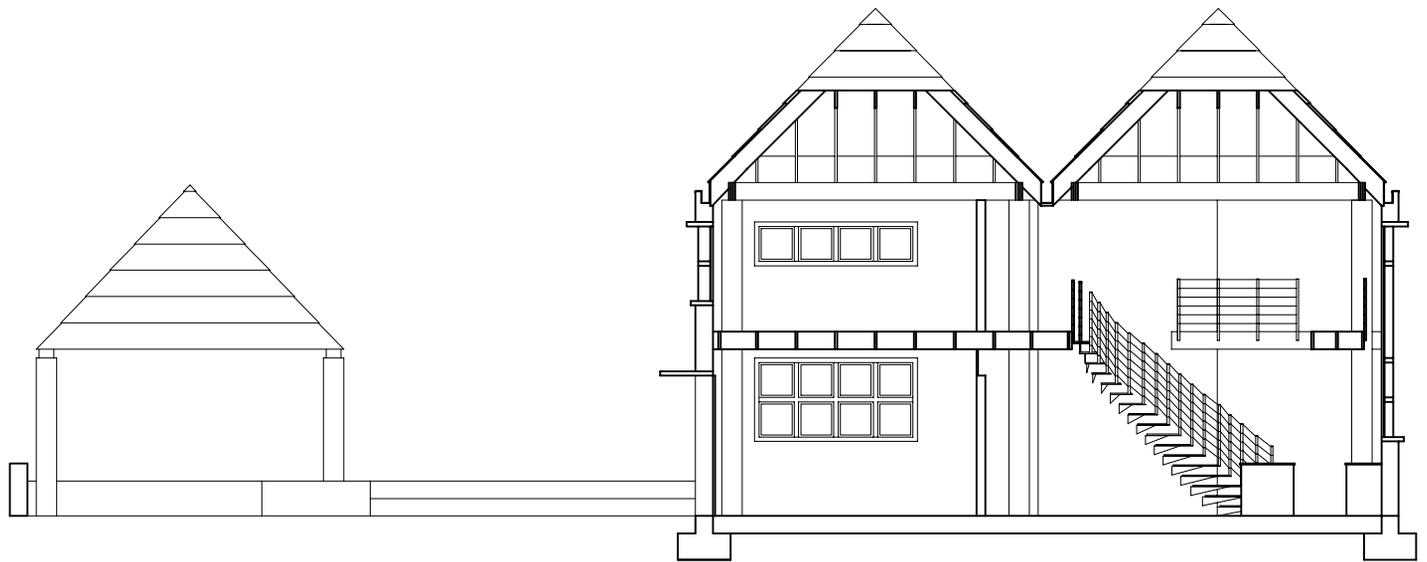


1. Gazebo
2. Bedroom
3. Open to below
4. Kitchen



North South Section

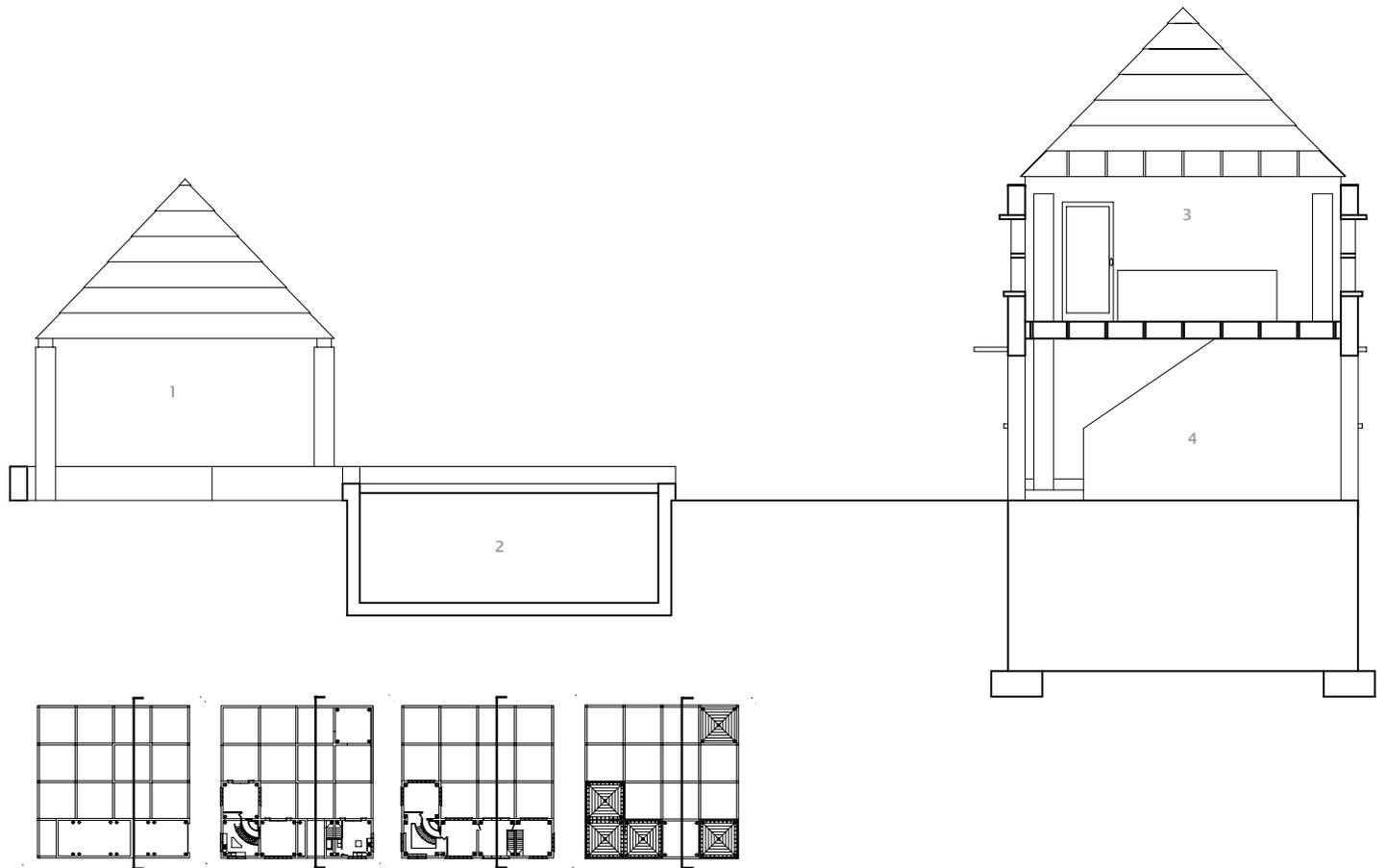
View from Living Room (a) toward Kitchen



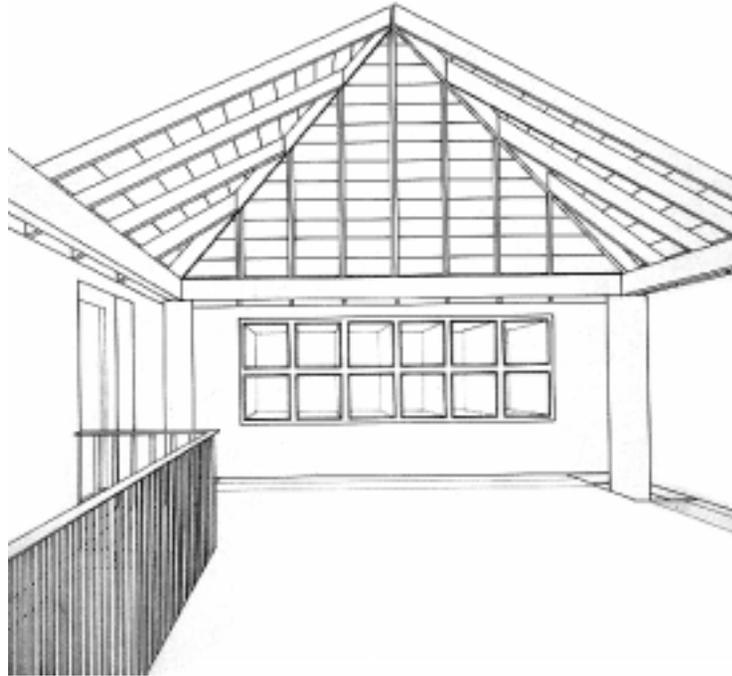
1. Gazebo
2. Pool
3. Open Terrace
4. Entrance "tunnel"



North South Section

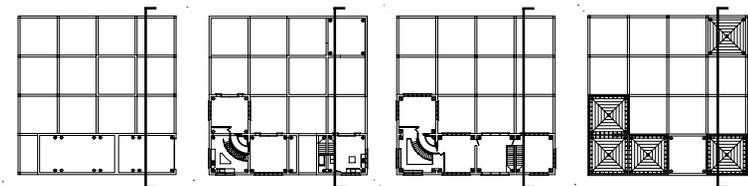
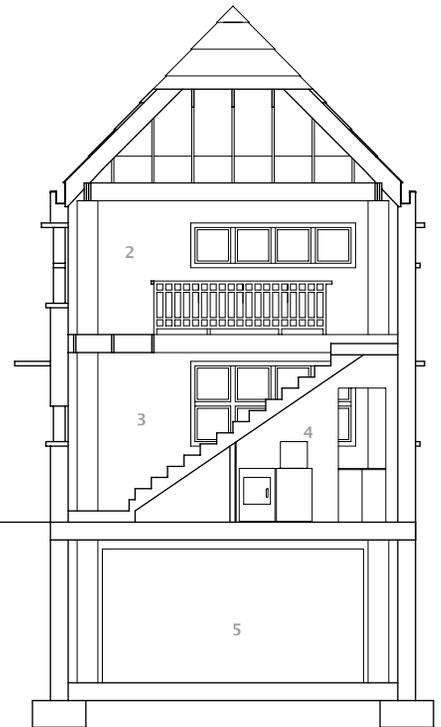
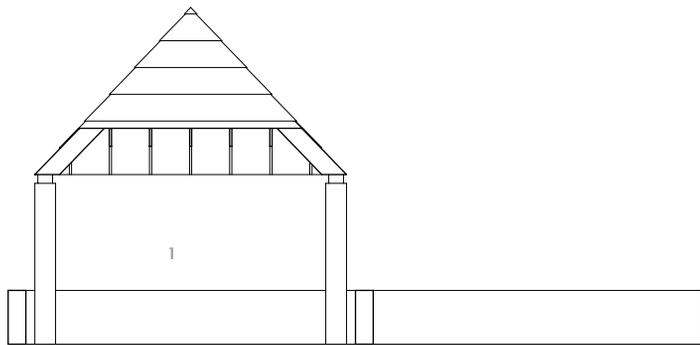


1. Gazebo
2. Bedroom Guest House
3. Living Room
4. Bathroom
5. Garage



North South Section

Guest House Bedroom looking South



CONCLUSION

An exploration of order as it is defined architecturally is the topic of this thesis. Structural elements, materials and floor patterns create the ordering device 'grid' that is literally experienced as one moves from room to room.

The regularity and uniformity of the grid is both a strength and a weakness. Without diversity, the grid can lead to static or monotonous architecture. In contrast, architecture with random arrangements of elements can lead to chaos.

A small house is an investigation of the strength of a uniform grid tempered with human diversity.



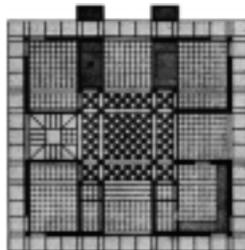
Image Credits



The New International Atlas
p. 239



Sandi Harris
p. 21



Deutsches Architektenblatt
p. 31

All other images produced by author.

ENDNOTES

¹ Bourne, Gloria. Meet the Virgins.... The Settler's Handbook for the Virgin Islands (St. Croix: Megnin Publications, 1992) 9-11.

² Bourne, Gloria. Meet the Virgins.... The Settler's Handbook for the Virgin Islands (St. Croix: Megnin Publications, 1992) 14-15.

³ Lowbell, John. Between Silence and Light (Boulder: Shambhala Publications, 1979) 63.

⁴ Ching, D.K. Francis. Architecture: Form, Space and Order (New York: Van Nostrand Reinhold, 1979) 57.

⁵ Ching, D.K. Francis. Architecture: Form, Space and Order (New York: Van Nostrand Reinhold, 1979) 86.

⁶ Futagawa, Yukio. Editor. GA: Luis Barragan, House and Ateilier for Luis Barragan (Tokyo: A.D.A. Edita, 1975) 7.

⁷ Brownlee, D.B. and DeLong, D.G. Louis I. Kahn: In the Realm of Architecture (New York: Rizzoli, 1991) 78.

SELECTED BIBLIOGRAPHY

Adams, William Howard.
Jefferson's Monticello.
New York: Abberville Press. 1983.

Andrews, E.D. and Andrews, F.
*Shaker Furniture: The Craftsmanship of
an American Communal Sect.*
New York: Dover Publications. 1964.

Bachelard, Gaston.
The Poetics of Space.
Boston: Beacon Press. 1994.

Baker, Geoffrey H.
Le Corbusier: An Analysis of Form.
London: Van Nostrand Reinhold. 1989

Battilotti, Donata.
The Villas of Palladio.
Milano: Electa. 1990.

Beset, Maurice.
Le Corbusier.
New York: Rizzoli. 1976.

Bourne, Gloria.
*Meet the Virgins.... The Settler's Handbook for
the Virgin Islands.*
St. Croix: Megnin Publications. 1992.

Brownlee, D.B. and DeLong, D.G.
Louis I. Kahn: In the Realm of Architecture.
New York: Rizzoli. 1991.

Ching, D.K. Francis.
Architecture: Form, Space and Order.
New York: Van Nostrand Reinhold. 1979.

Farber, Joseph.
Palladio's Architecture and its Influence.
New York: Dover Publications. 1980.

Forssman, Erik.
Visible Harmony.
Stockholm: Royal Academy of Fine Arts. 1973.

Futagawa, Yukio. Editor.
*GA: Ludwig Mies van der Rohe,
Farnsworth House.*
Tokyo: A.D.A. Edita. 1974.

Futagawa, Yukio. Editor.
*GA: Luis Barragan, House and
Ateilier for Luis Barragan.*
Tokyo: A.D.A. Edita. 1975.

Guinness, D. and Sadler, J.T. Jr.
Palladio, a Western Progress.
New York: Viking Press. 1976.

Hersey, G. and Freedman, R.
Possible Palladian Villas.
Cambridge: MIT Press. 1992.

Kahn, Louis I.
"Statements". Art and Architecture.
V.78 February 1961.

Le Corbusier.
Towards a New Architecture.
New York: Dover Publications. 1986.

Llewellyn, Robert.
Thomas Jefferson's Monticello.
Charlottesville: Thomas-Grant. 1983.

SELECTED BIBLIOGRAPHY

Lowbell, John.
Between Silence and Light.
Boulder: Shambhala Publications. 1979.

McNally, Andrew III.
The New International Atlas.
Chicago: Rand McNally. 1989.

Muller-Dietrich, Ingeborg.
Deutsches Architektenblatt.
V.18, No.12, December 1986.

Norberg-Schultz, Christian.
The Concept of Dwelling.
New York: Rizzoli. 1984.

Rieman, T.D. and Burks, J.M.
The Complete Book of Shaker Furniture.
New York: Harry N. Abrams, Inc. 1993.

Roucheleau, P. and Sprigg, J.
Shaker Built.
New York: Monacelli Press. 1994.

Ronner, H. and Jhaveri, S. and Vasella, A.
Louis I. Kahn: Complete Works 1935-74.
Boulder: Westview Press. 1977.

Rowe, Collin.
*The Mathematics of the Ideal Villa,
and Other Essays.*
Cambridge: MIT Press. 1976.

Russel, Frank. Editor.
Mies van der Rohe: European Works.
New York: St. Martins Press. 1986.

Spaeth, David.
Mies van der Rohe.
New York: Rizzoli. 1985.

Toy, Maggie. Editor.
Aspects of Minimal Architecture.
London: England. 1994.

Trager, Philip.
The Villas of Palladio.
Boston: Little, Brown & Company. 1986.

Venturi, Robert.
Complexity and Contradiction in Architecture.
New York: Museum of Modern Art. 1992.

Wundram, M. and Pape, T. and Marton, P.
Andrea Palladio, 1508-1580.
West Germany: Benedikt Taschen. 1979.

VITA

04.28.65
Karen Harris Amodeo

December 1999
Masters of Architecture
Virginia Polytechnic Institute and State University
Blacksburg, Virginia

May 1987
Bachelor of Science, Nursing
Mount Saint Mary College
Newburg, New York

