

**Order and Flexibility:**  
Their Coexistence as Architectural Principle

Michael Malofiy

This thesis submitted to the faculty  
of the Virginia Polytechnic Institute & State  
University in partial fulfillment of the  
requirement for the degree

Master of Architecture

July 1998  
Blacksburg, VA

---

William Brown, thesis committee chairman

---

Michael O'Brien

---

Frank Weiner

## ABSTRACT

The design **process** is a means to an end. It is the **vehicle** one uses to reach a destination. It is driven by past experiences, the advice from others or intuition.

The **thesis** is a **journey**. For some, the destination is known before the journey even begins. For others, the destination is found somewhere along the way. For me, the destination is in sight, yet it constantly moves just out of reach. Each new discovery demands further exploration.

In the journey, the **project** represents all of the **discoveries** made along the way. Each step forward is an attempt to reinforce that which the traveller has already discovered or to inform the traveller to change directions.

Thus, what is important about a journey is not only how one gets there, but also what is discovered along the way.

"...But desire is insatiable and you cannot ever know what it is. It is renewed all the time."<sup>1</sup>

Louis Kahn

## THESIS TABLE OF CONTENTS

Title Page.....	i
Abstract.....	ii
Table of Contents.....	iii
I. Introduction.....	1
II. Precedence.....	2
A. Order	
1. Pantheon.....	3
2. Regulating lines.....	4
B. Flexibility	
1. Schroder House.....	5
2. Fukuoka housing.....	6
C. When order meets flexibility	
1. Palace of Emperor Saga.....	7
2. Expanding circular table.....	8
III. Project/Process	
A. Beginning: Serious Play.....	9
1. Site.....	10
2. Local architectural condition as project generator.....	11
3. Wood block studies.....	12-14
4. Translation of wood blocks into points, lines, planes and volumes.....	15-16
B. Development of a single unit.....	17
1. Study model 1.....	18
2. Study model 2.....	19
3. Entry courtyard studies.....	20
4. Column and beam studies.....	21
5. Material and detail studies.....	22
6. Precast panel details.....	23-24
7. Window studies.....	25-27
8. Study of a dining space.....	28
9. Flexibility within an ordered system.....	29-30
C. Combining Units.....	31
1. Joining and stacking units.....	32
2. Vertical connections.....	33
D. Development of the Site.....	34
1. Regulating lines.....	35
2. Outdoor spaces and contextual relationships.....	36
3. Axis.....	37
4. Site.....	38
E. Refinement of the single unit and site.....	39
1. Developing an architectural language out of the triangle - study 1.....	40
2. Study model and details.....	41
3. Perspective studies.....	42
4. Developing an architectural language out of the triangle - study 2.....	43
5. Study model and details.....	44
6. Site.....	45
7. Detailed unit study.....	46
F. Sketches.....	47
IV. Endnotes.....	48
V. Photographic Credits.....	49
VI. Bibliography.....	50
VII. Vita.....	51

## I. INTRODUCTION

order

uniformity

fixity

homogeneity

regularity

concreteness

stillness

silence

wholeness

singularity

harmony

geometry

Two opposing principles necessary for architecture to endure are order and flexibility. Order is a static condition which establishes and maintains organization. It relates the parts to the whole and conversely, the whole to the parts. Order provides the rules to define what something can be and more importantly, what it cannot. Flexibility is a dynamic condition which offers diversity. It allows a user or inhabitant to manipulate or control that which the designer has provided. Such a condition allows the individual to become engaged with or a part of the architecture. However, flexibility can occur within an ordered system.

**Architecture exists where the duality meets.**

An example to illustrate this theory is a housing community for university students. Because university students typically only spend one to three years in a single residence, a dwelling which can be adapted quickly and with little effort to accommodate different needs is essential. In this case, movable interior partitions are ideal for allowing students to make changes within their units. The interior can be changed based on how the spaces are used, the time of day, season, or the number of students or family members living in the unit(s). Order is fittingly created by the structural system. Its static condition maintains organization and clarity and juxtaposes itself against the dynamic nature of the interior partitions.

Considered separately, both order and flexibility languish in that which makes them flourish. A highly ordered system alone becomes sterile while a solely flexible one becomes chaotic and unpredictable. However, the prosperity of the two depends on their coexistence.

chaos

multi-formity

flexibility

variety

diversity

abstraction

motion

noise

fragmentation

plurality

discord

derangement

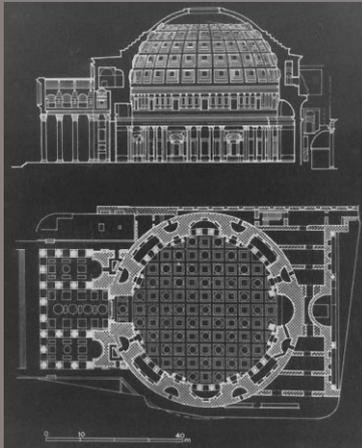
II. PRECEDENCE

P R E C E D E N C E

## II. PRECEDENCE

### order

In architecture, order is often created by geometry. The operations of translation, rotation and reflection are used to establish an authority which can either be absolute and unyielding or subject to change. Whether or not this framework can be altered depends on other concerns or discoveries revealed through the course of the design process.

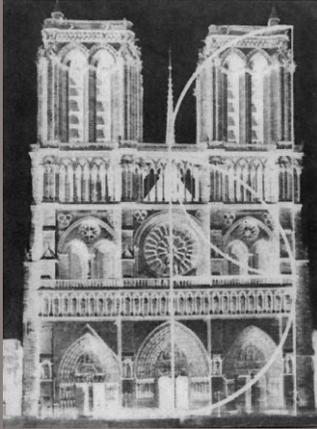


Pantheon plan and section

"...One element necessary for the crystallization of architecture is pure geometry, as in the Pantheon. This is the base or framework that endows architecture with presence."<sup>2</sup> - Tadao Ando

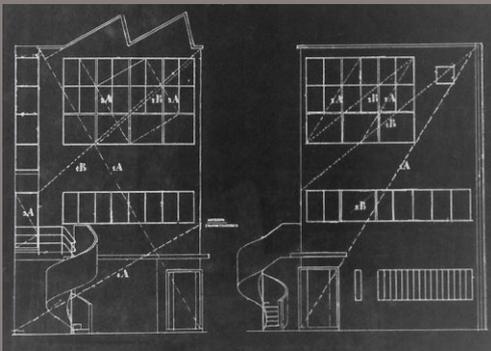
## II. PRECEDENCE

order



Notre Dame, Paris

"...An inevitable element of Architecture. The necessity for order. The regulating line is a guarantee against wilfulness. It brings satisfaction to the understanding. The regulating line is a means to an end. Its choice and the modalities of expression given to it are an integral part of architectural creation."<sup>3</sup> - LeCorbusier



house by LeCorbusier and Pierre Jeanneret, 1923

## II. PRECEDENCE

flexibility



upper floor interior view with partitions partially closed

**1920's  
Schroder House  
Utrecht  
Gerrit Rietveld**

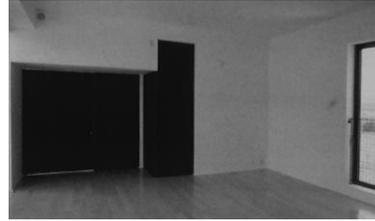
"The concept of flexibility creates a building which is not a fixed entity, but a palimpsest on which can be inscribed any life style and any life view."<sup>4</sup> - Gerrit Rietveld, *De Stijl*



upper floor interior view with partitions open

## II. PRECEDENCE

flexibility



interior view with partitions closed (above) and open (below)



**1990's  
Fukuoka Housing, Japan  
Steven Holl**

Steven Holl's concept of "hinged space" gives modern application to the versatility of the traditional Japanese fusuma sliding panel. Light, colorful wooden walls turn on pivotal hinges, making it possible to combine or isolate spaces according to hour, season and family make-up.



interior view with partitions closed (above) and open (below)



## II. PRECEDENCE

when order meets flexibility



interior view with fusuma closed

1300's  
Daikakuji  
Palace of Emperor Saga  
Kyoto City

The origin of movable interior partitions can be traced to the Japanese fusuma. These sliding panels were constructed with a wooden frame strengthened by cross battens to which several layers of paper were glued. A layer of decorative paper was then fixed over the whole and the faces were typically painted to depict a story. The fusuma allowed the house to change with the day and season. Their dynamic nature was sharply contrasted by the static condition of the heavy timber posts and beams which brought order to the whole.



interior view with fusuma open

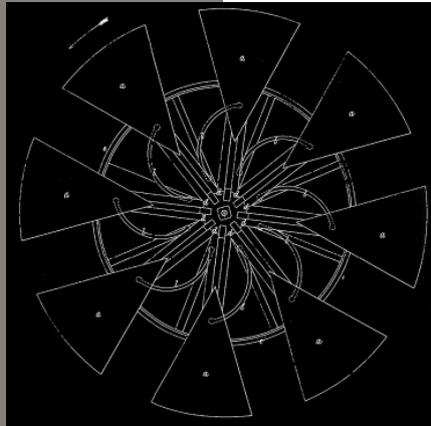
## II. PRECEDENCE

when order meets flexibility

1800's-expanding table-Robert Jupe-England



table closed



patent drawing



table expanded

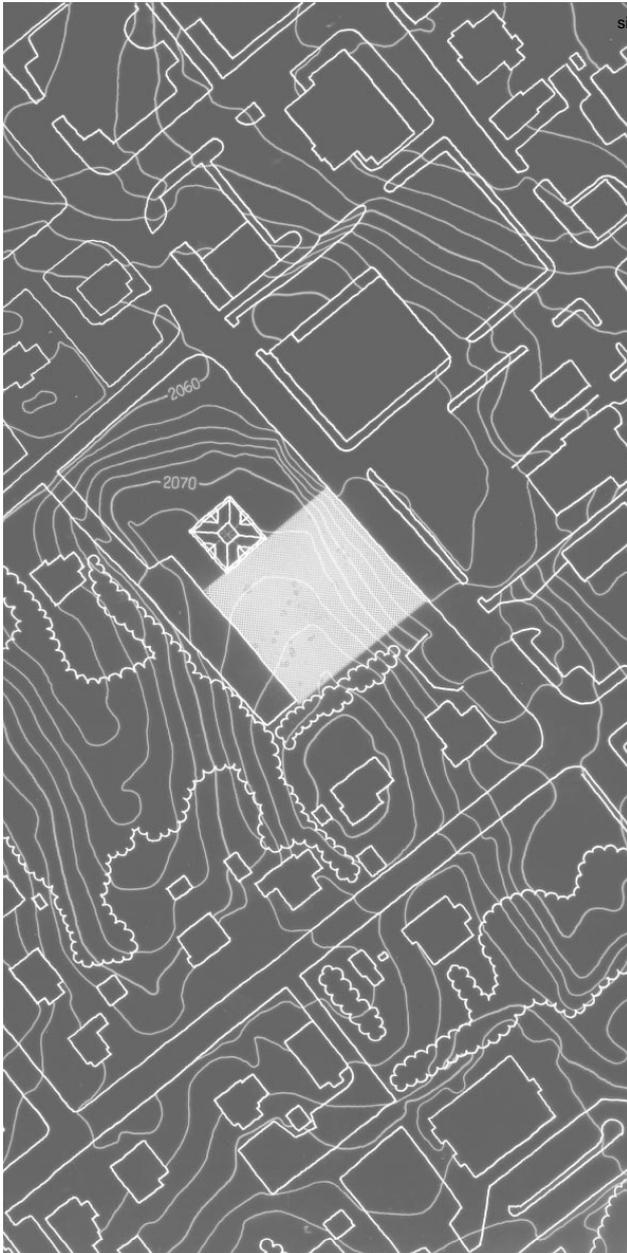
"...like a flower opening it's petals."<sup>5</sup> - David Linley, *Extraordinary Furniture*

III. PROJECT/PROCESS



B E G I N N I N G  
s e r i o u s p l a y

### III. PROJECT/PROCESS



factors, opportunities and constraints:

location:

Blacksburg, VA  
three blocks east of university campus  
hillside adjacent to historic building

(Built in the 1830's, the Thomas C. Connery house terminated Lee Street at Draper Road and marked the boundary of the original sixteen squares of Blacksburg. Today, it is used for university offices but its presence marking the intersection at Lee and Draper remains.)

-new construction should complement or even enhance existing building and not have an overly imposing presence over the relatively small building

-parking lot behind existing building and street parking along Draper Road to be used by residents

-woods to the rear of the site to be preserved, offer views of nature

### III. PROJECT/PROCESS

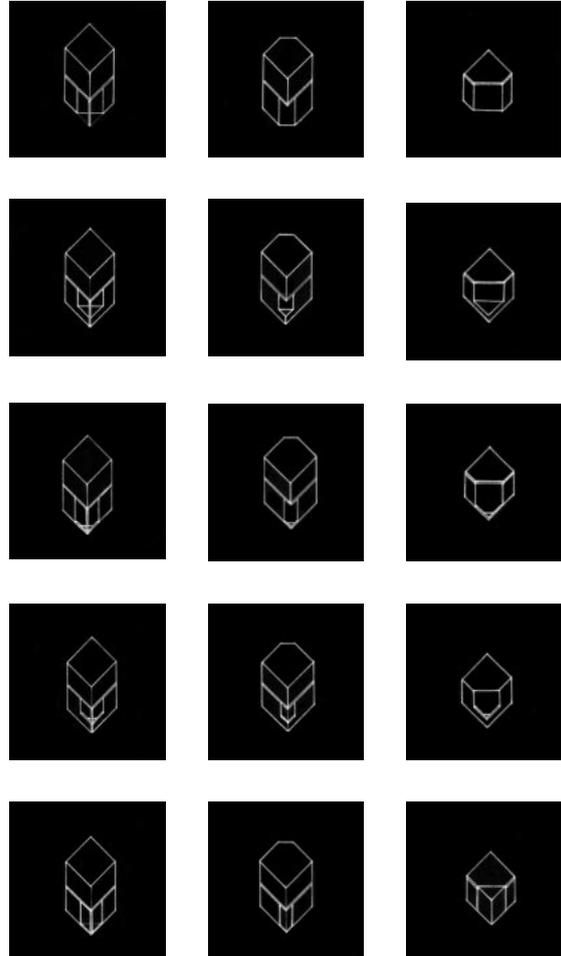
local architectural condition as project generator



intersection at Roanoke and Main Streets  
(northwest corner)



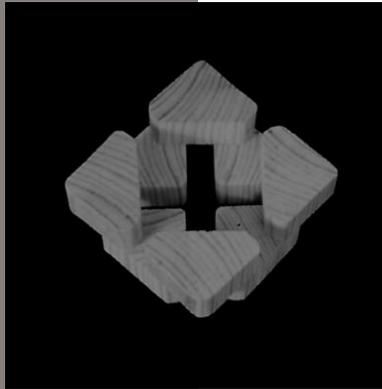
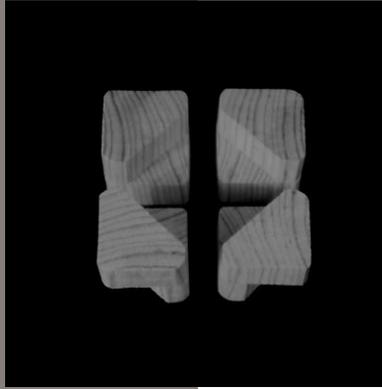
intersection at Roanoke and Main Streets  
(southeast corner)



corner studies

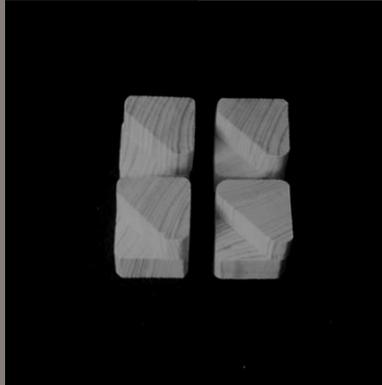
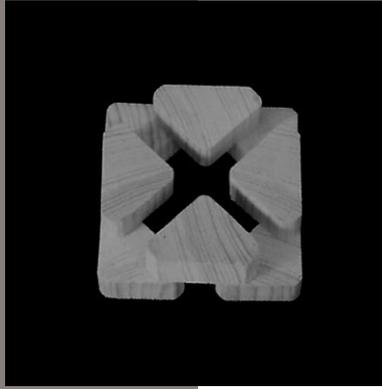
### III. PROJECT/PROCESS

wood block studies



### III. PROJECT/PROCESS

wood block studies

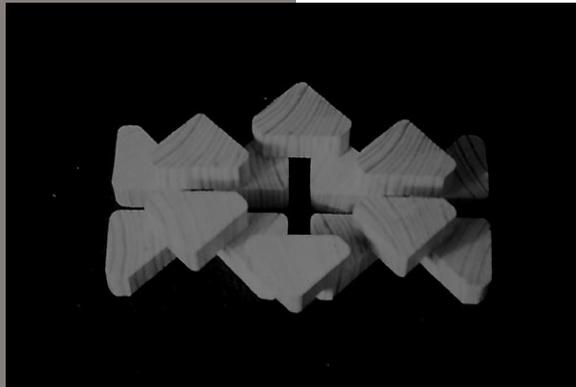


### III. PROJECT/PROCESS

wood block studies

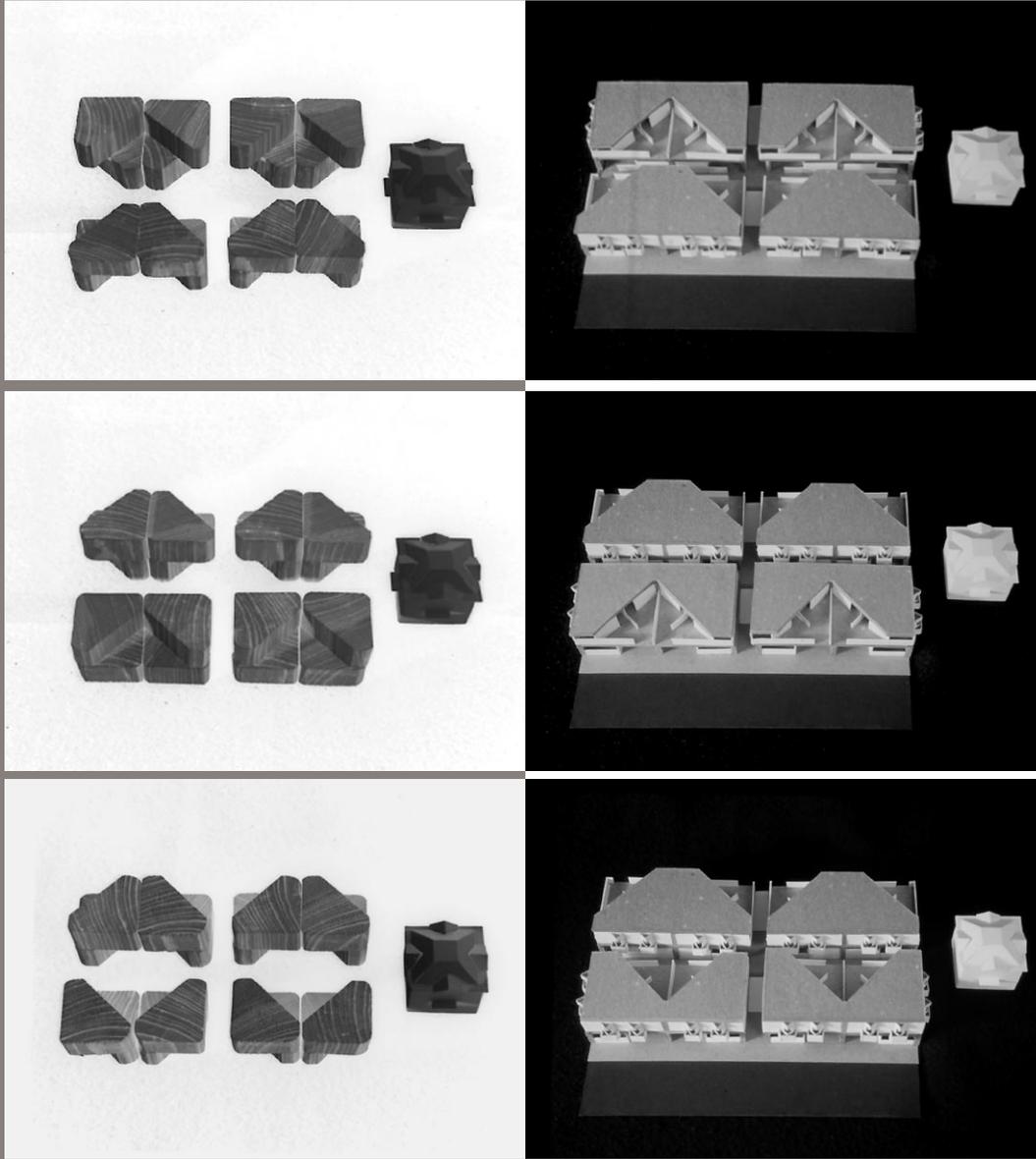


"...A musical instrument has as many possibilities as the uses to which it is put. An instrument must be played. Within the limits of the instrument, it is up to the player to draw what he can from it, within the limits of his own ability. Thus, the instrument and player reveal to each other their respective abilities to compliment and fulfill one another."<sup>6</sup> - Herman Hertzberger, *Form as a Musical Instrument*



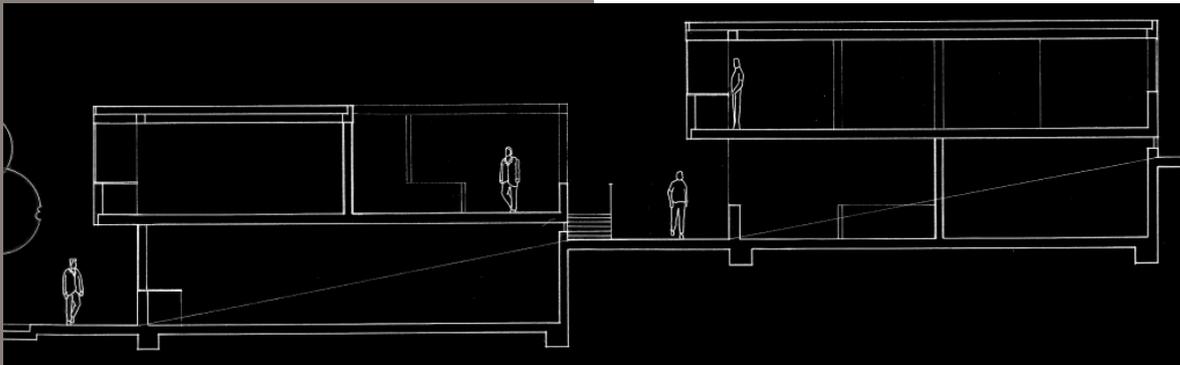
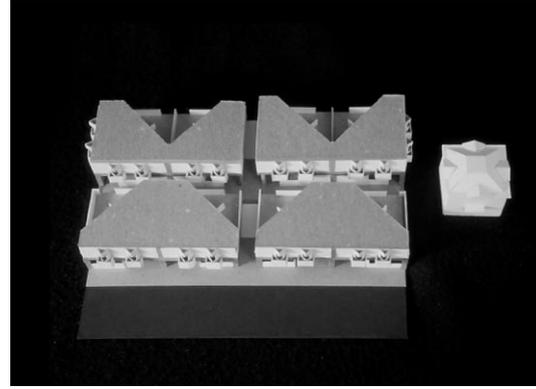
### III. PROJECT/PROCESS

translation of wood blocks into points, line planes and volumes

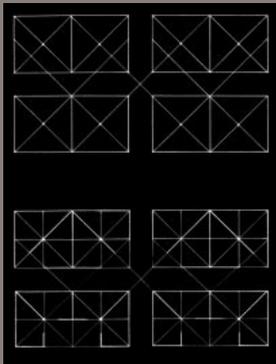


### III. PROJECT/PROCESS

translation of wood blocks into points,lines,planes and volumes



section



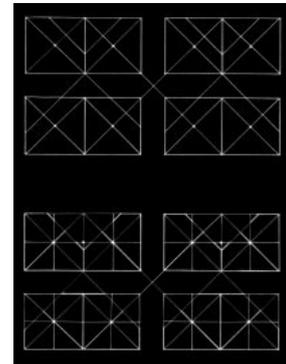
plan diagram (lower level)



perspective view along primary axis



perspective view along transverse axis

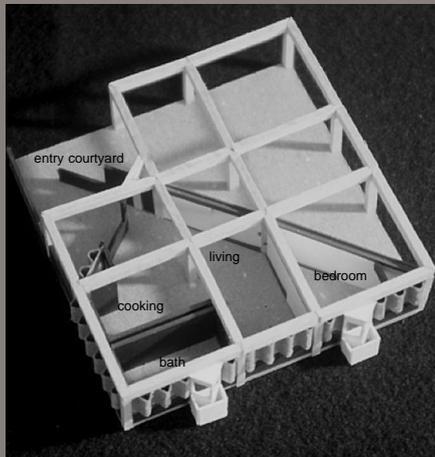


plan diagram (upper level)

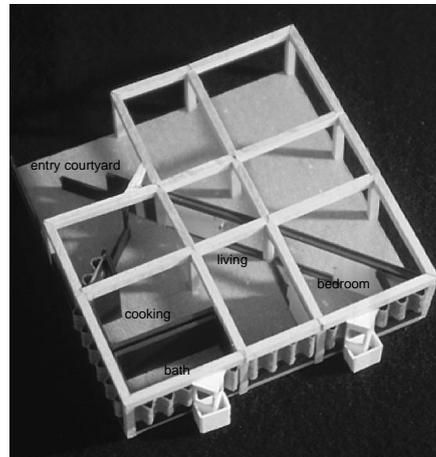
D E V E L O P M E N T  
o f a s i n g l e u n i t

### III. PROJECT/PROCESS

study model 1



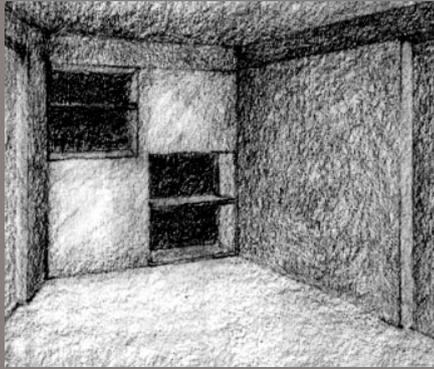
view of model (partitions closed)



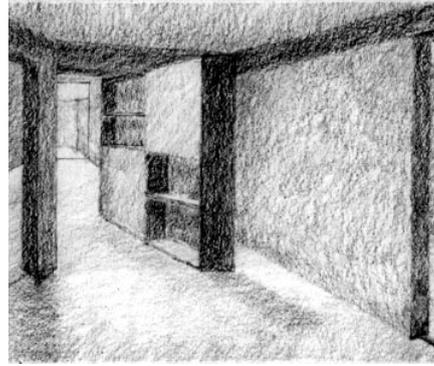
view of model (partitions open)

### III. PROJECT/PROCESS

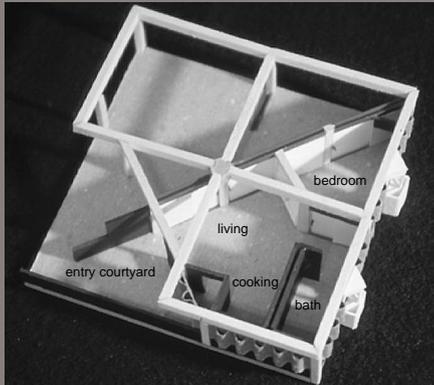
study model 2



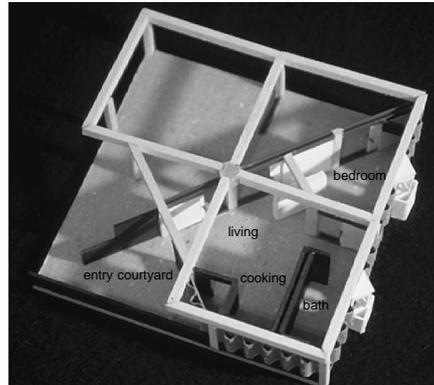
perspective view from bedroom (partitions closed)



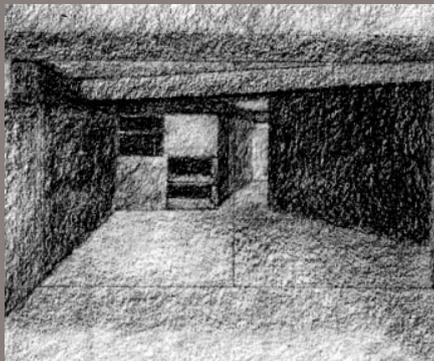
perspective view from bedroom (partitions open)



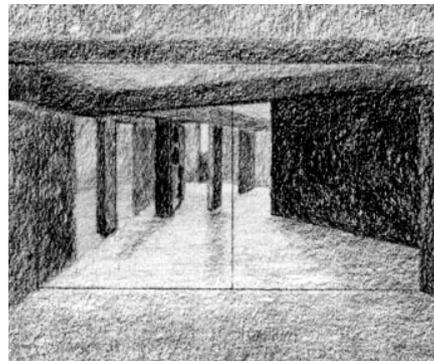
view of model (partitions closed)



view of model (partitions open)



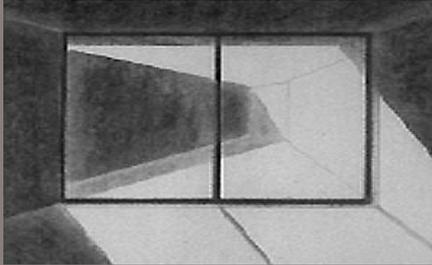
perspective view from entry courtyard (partitions closed)



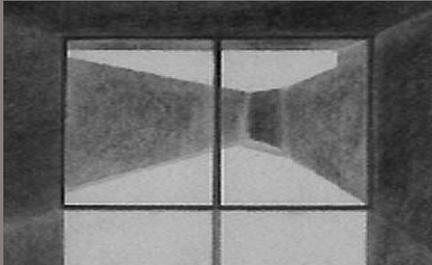
perspective view from entry courtyard (partitions open)

### III. PROJECT/PROCESS

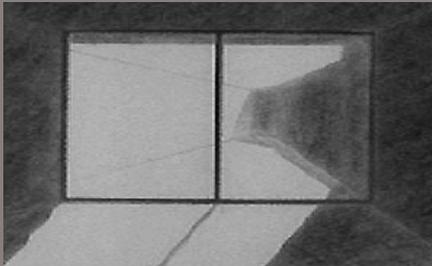
regularity established by architecture    variety provided by nature  
entry courtyard studies



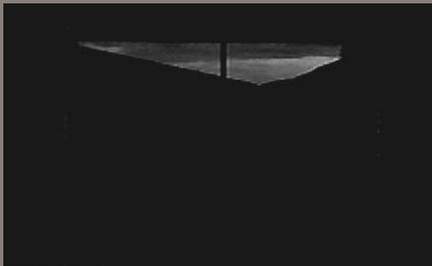
morning



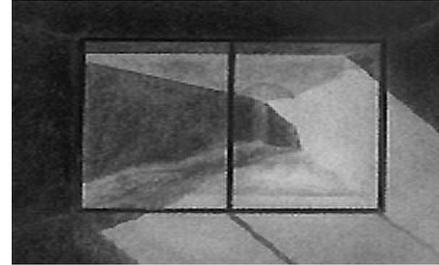
mid-day



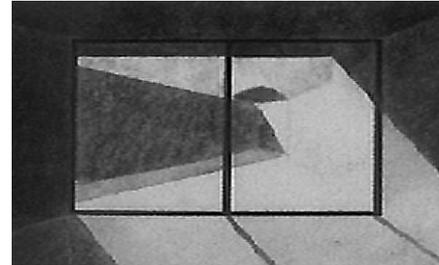
afternoon



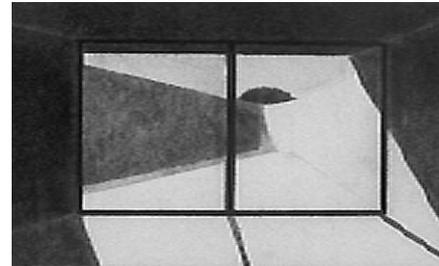
evening



winter



spring



summer

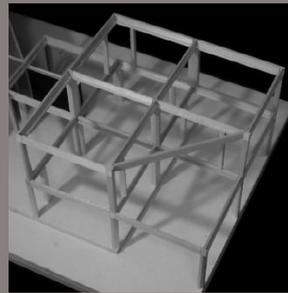
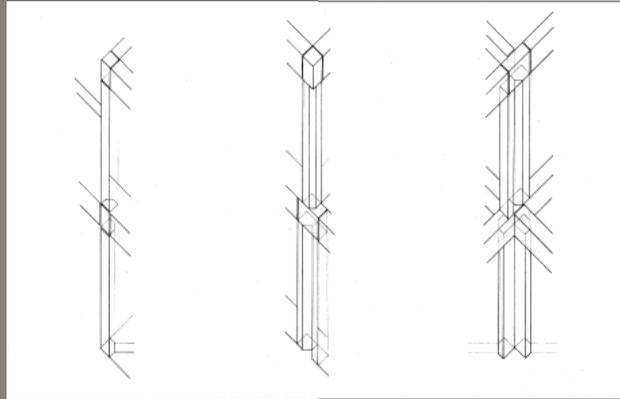


fall

"...The courtyard is an important place where seasonal changes can be directly perceived through the senses. The expression of nature changes constantly. Sunlight, wind and rain affect the senses and give variety to life. Architecture in this way becomes the medium by which man comes into contact with nature."  
Tadao Ando

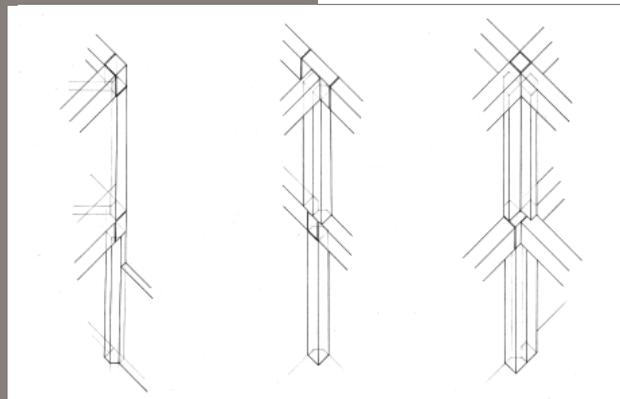
### III. PROJECT/PROCESS

#### column and beam studies



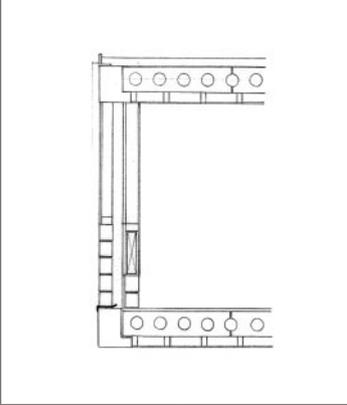
One column is used in a variety of ways. Such a strategy provides moments of architectural richness while at the same time maintaining an overall unity.

"...In a body, if the bones and the insides are healthy, then the skin as well should be healthy. One cannot detach the problems of the skin from deeper unresolved problems. The critical issue is never the facade, but always the structure."<sup>8</sup> - Mario Botta



### III. PROJECT/PROCESS

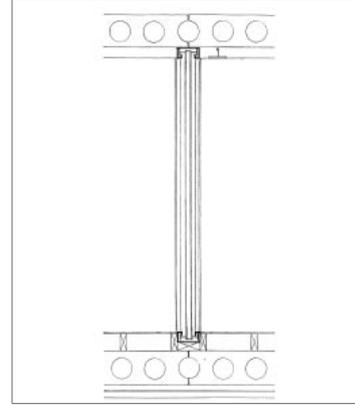
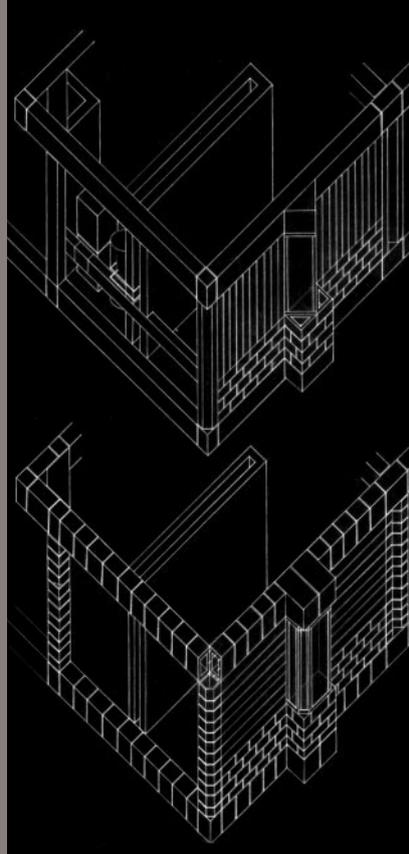
materials and detail studies



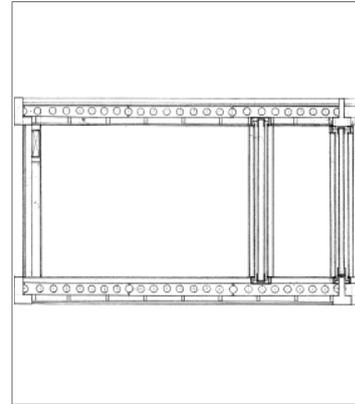
early wall section



stackable precast block



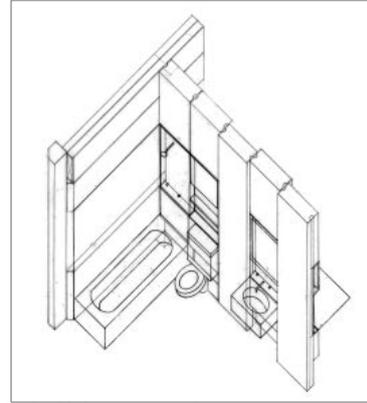
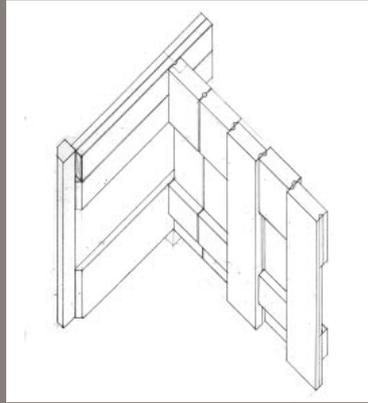
sliding panel study



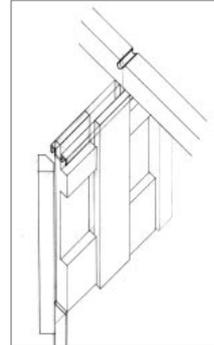
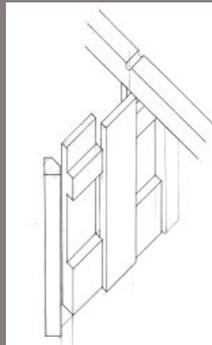
section study

### III. PROJECT/PROCESS

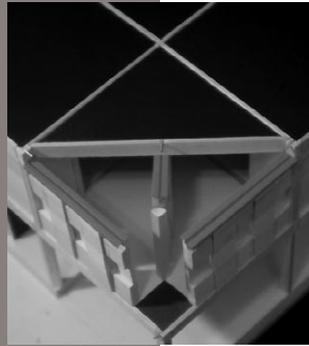
precast panel details



appliances and fixtures "plugged into" voids in precast panels



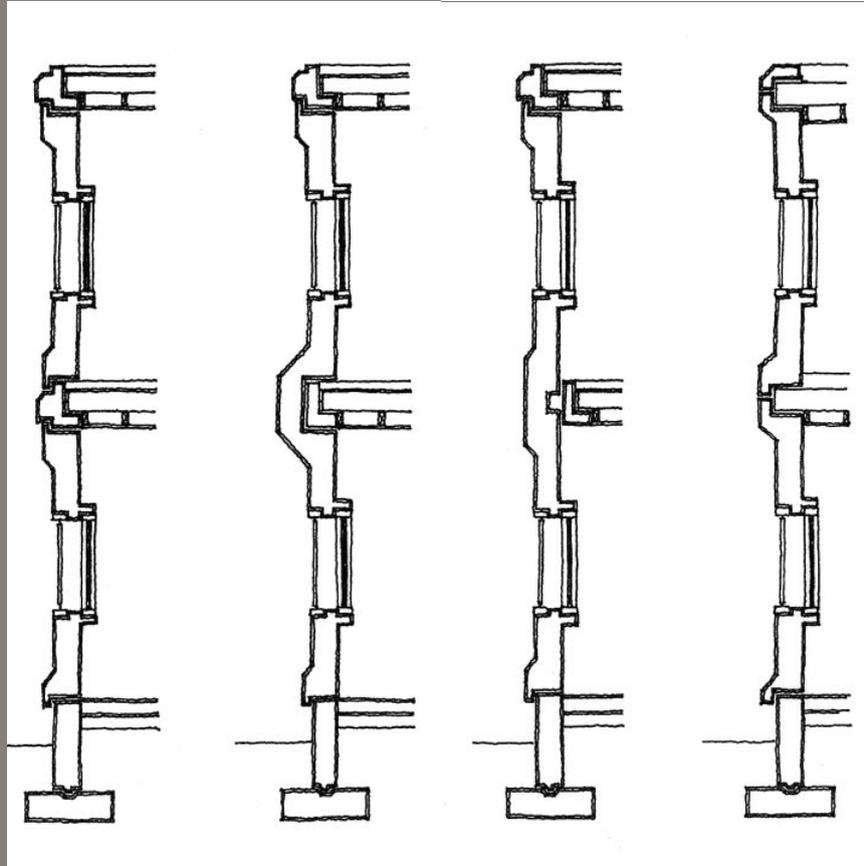
rain catches installed atop precast panels to receive water from roof



view of model showing rain catches

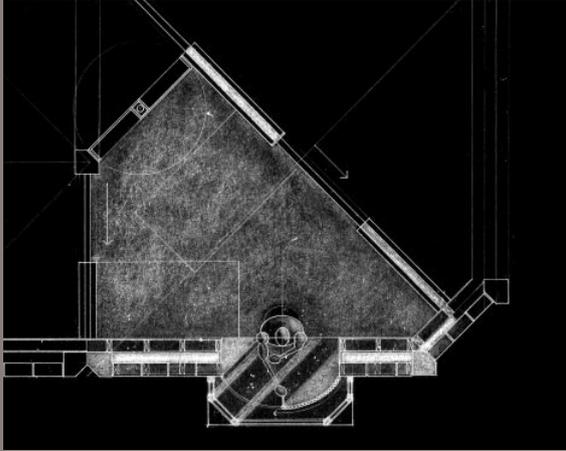
### III. PROJECT/PROCESS

precast panel studies

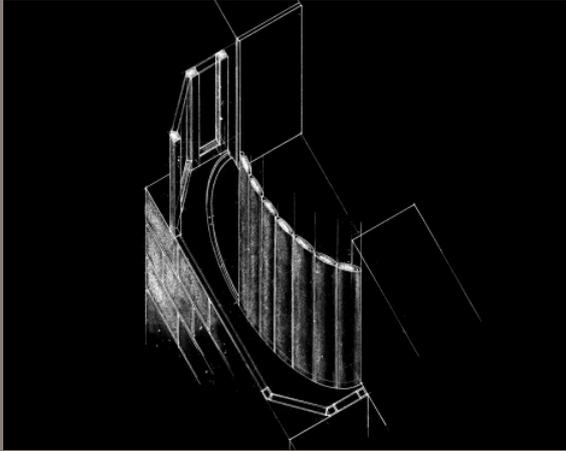


### III. PROJECT/PROCESS

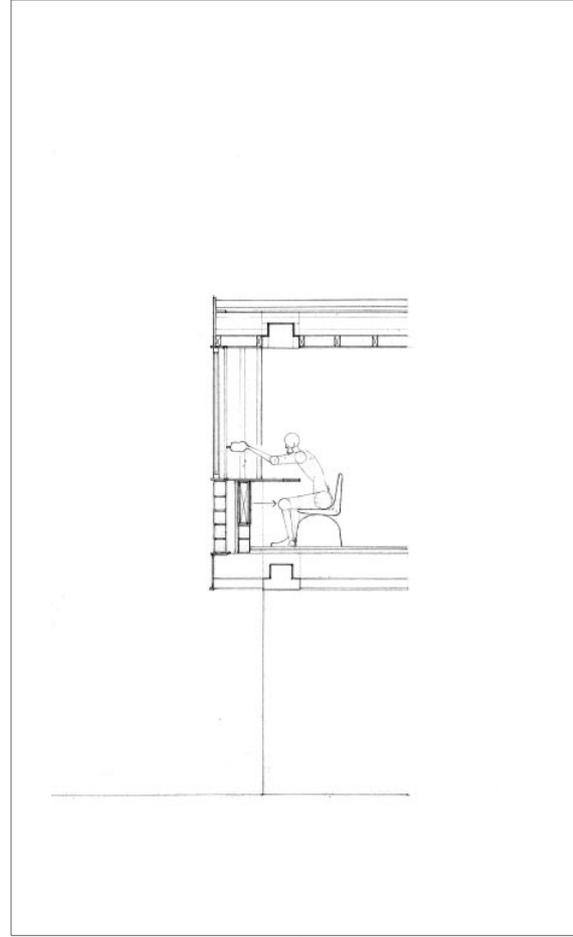
window studies



plan



cutaway axonometric view

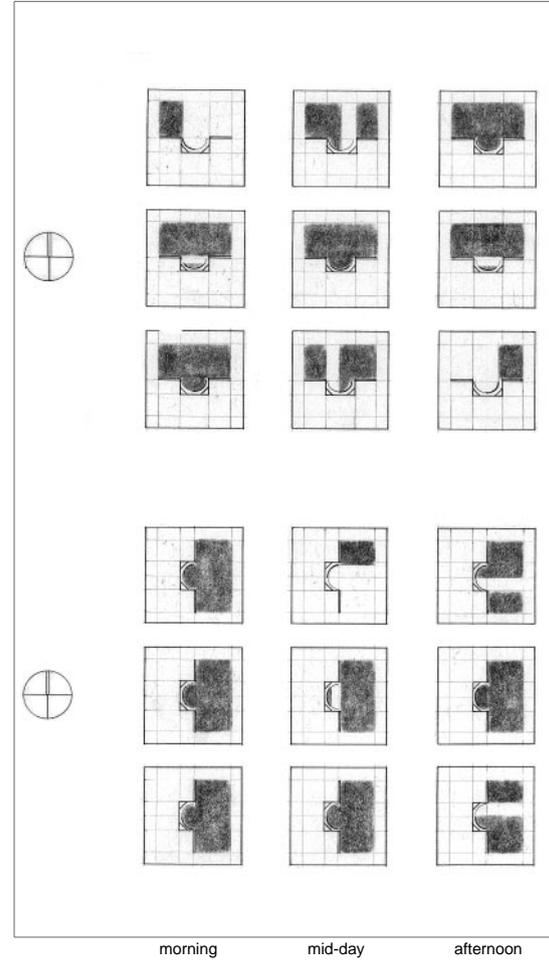
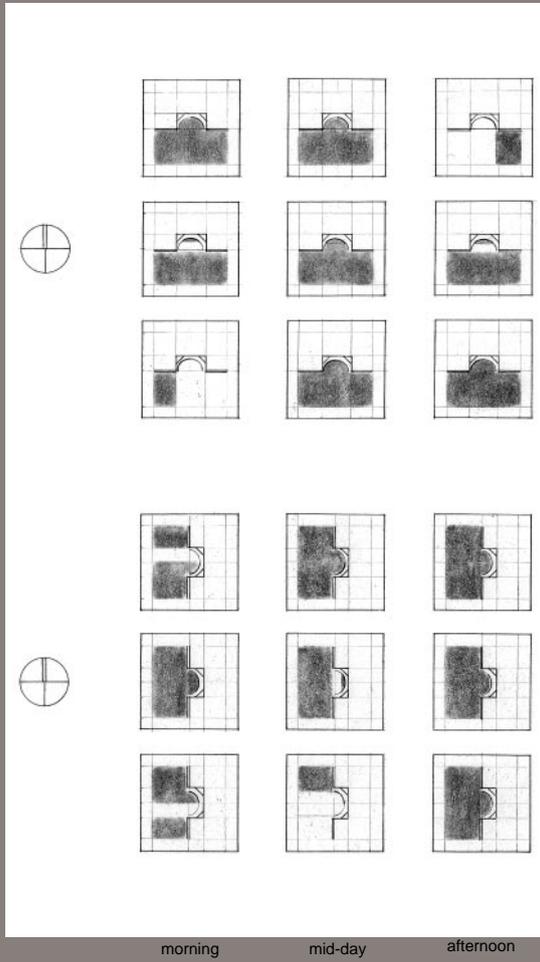


section

### III. PROJECT/PROCESS

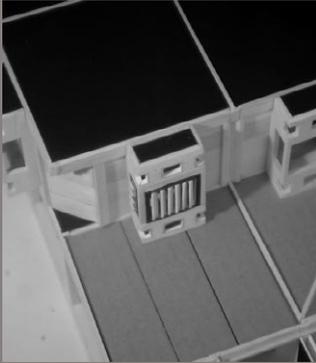
window studies

diagrammatic light studies

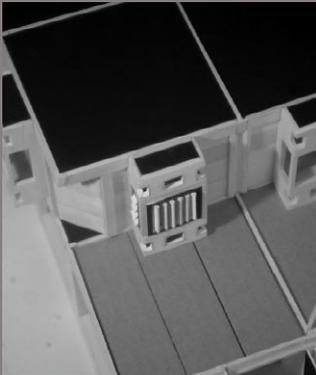


### III. PROJECT/PROCESS

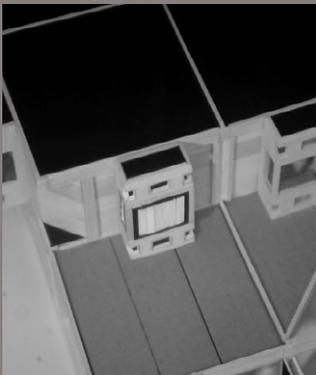
exterior conditions



louvers adjusted to receive direct light

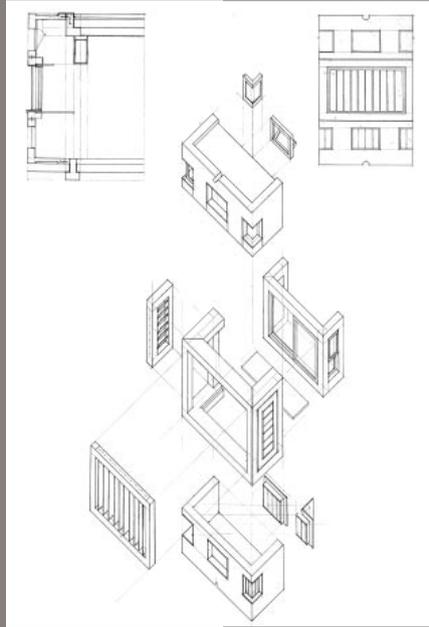


louvers adjusted to receive indirect light

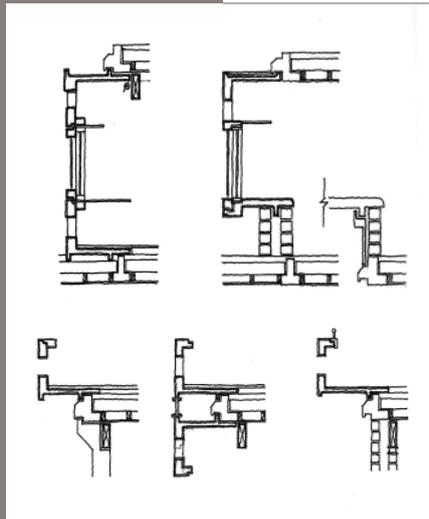


louvers adjusted to block out light

window studies



section, elevation and components study



window assembly variations

interior conditions



louvers adjusted to receive direct light



louvers adjusted to receive indirect light



louvers adjusted to block out light

### III. PROJECT/PROCESS

study of a dining space

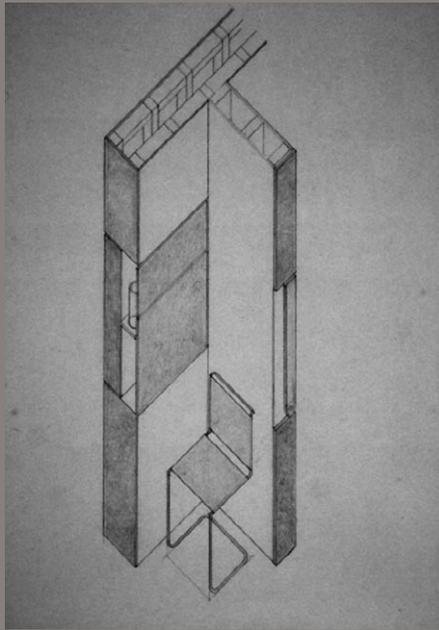


table raised

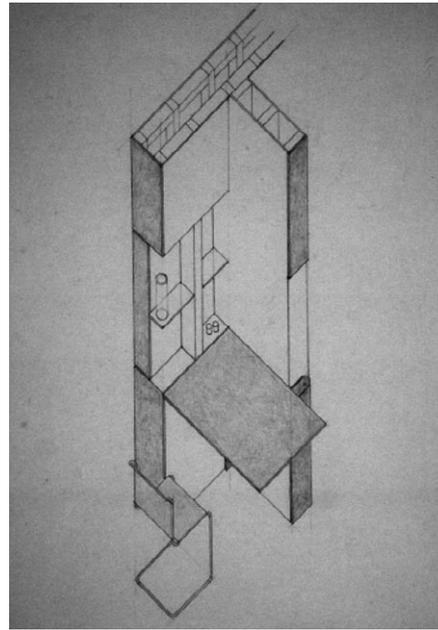
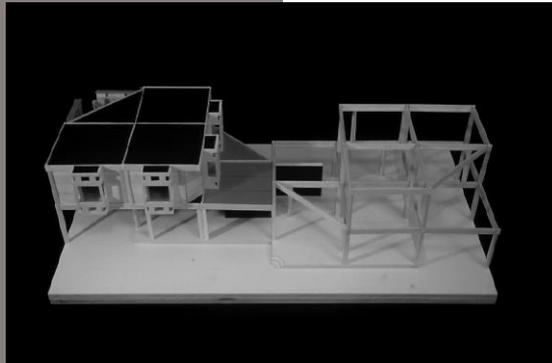


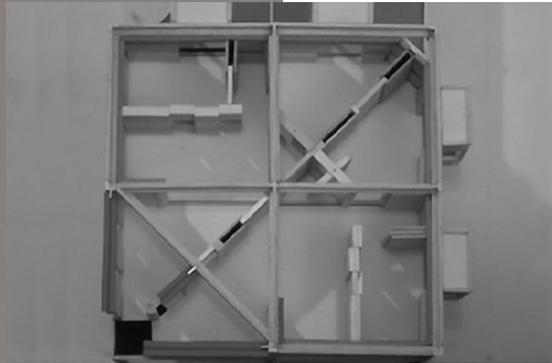
table lowered

### III. PROJECT/PROCESS

flexibility within an ordered system



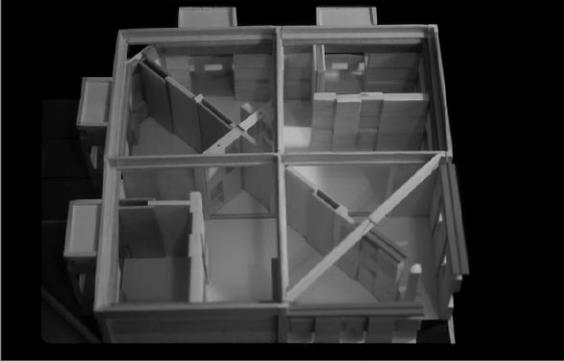
view of model showing eight units



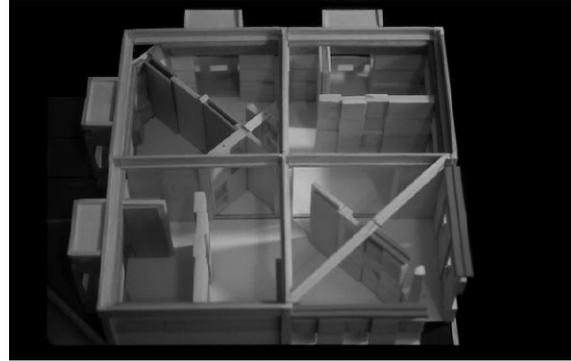
plan view of two units

### III. PROJECT/PROCESS

flexibility within an ordered system



two units separated, partitions closed (lower left) and open (upper right)

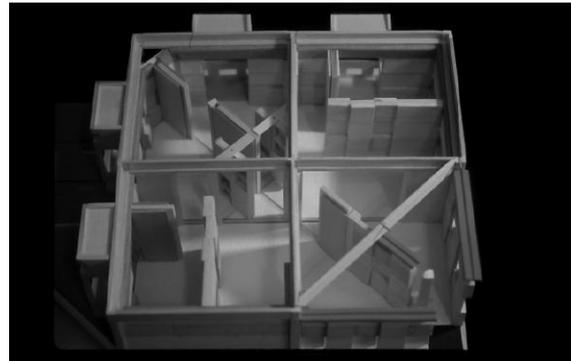


two units joined-partitions manipulated to maintain two separate living spaces

"...What has right size is at the same time both large and small, few and many, near and far, simple and complex, open and closed; will furthermore embrace both unity and diversity."<sup>9</sup>  
Aldo Van Eyck



two units joined-partitions manipulated to create one large central living space

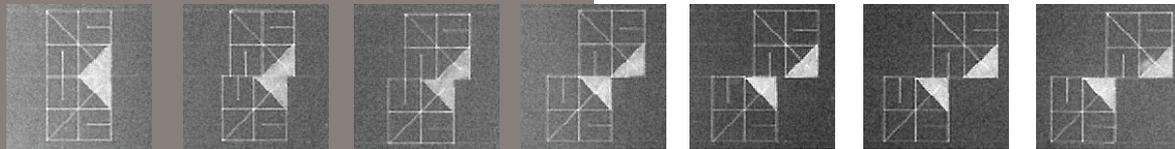
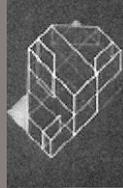
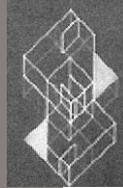
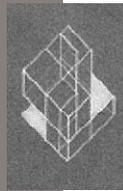
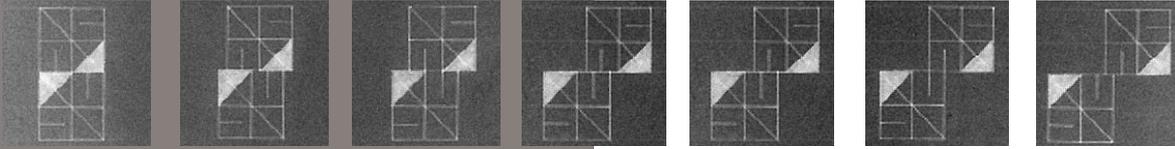


two units fully open

C O M B I N I N G U N I T S

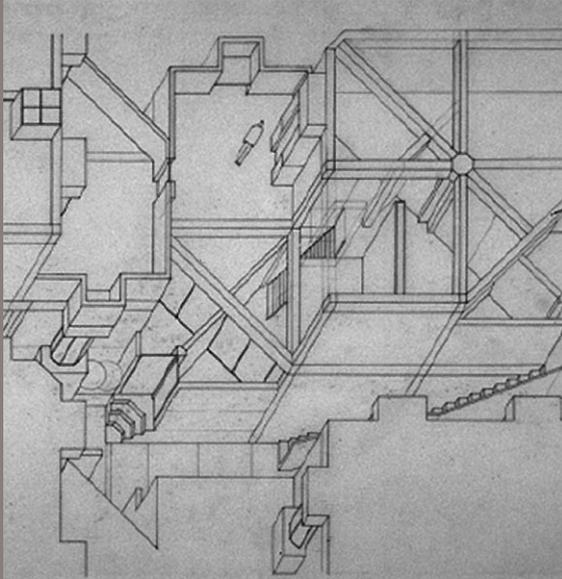
### III. PROJECT/PROCESS

joining and stacking units (diagrammatic studies)

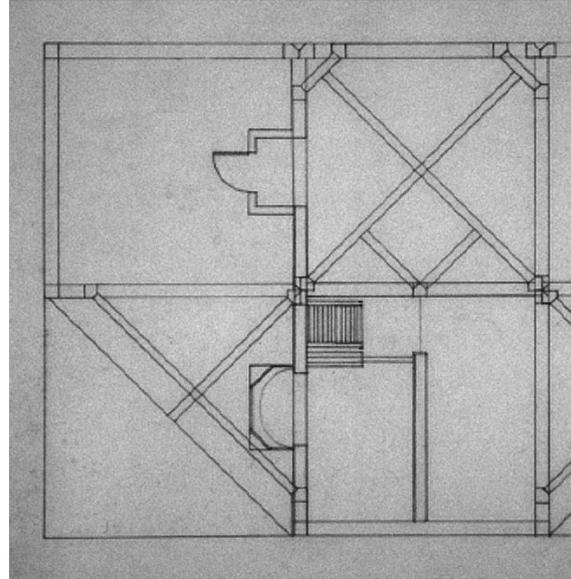


### III. PROJECT/PROCESS

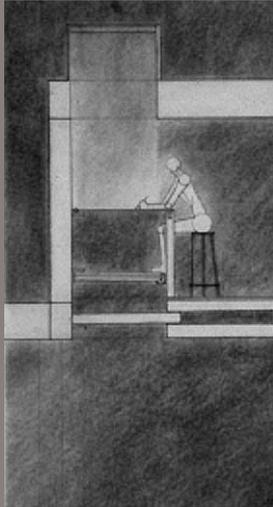
vertical connections



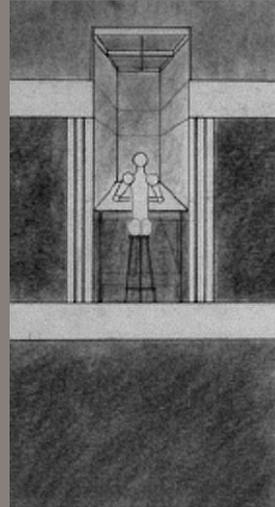
axonometric view



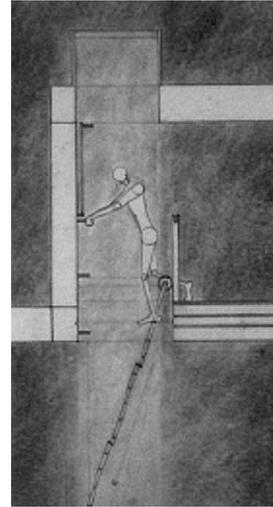
plan showing layering of units and alignment of structure



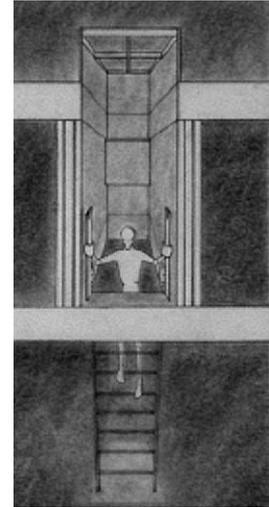
units separated



work area is lit from above



units connected

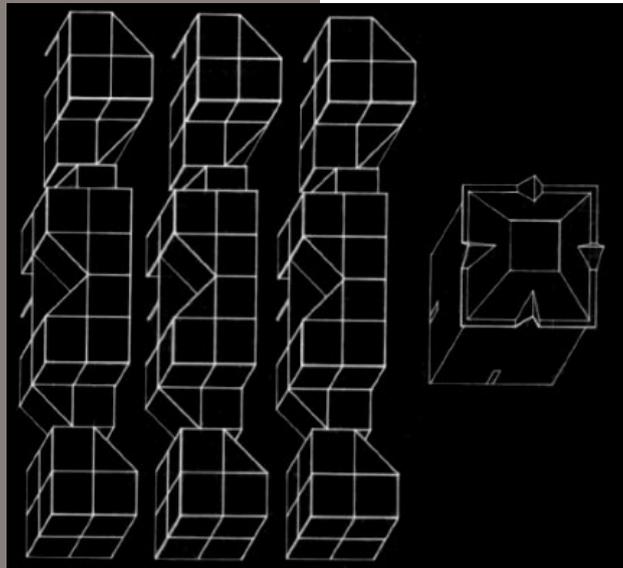
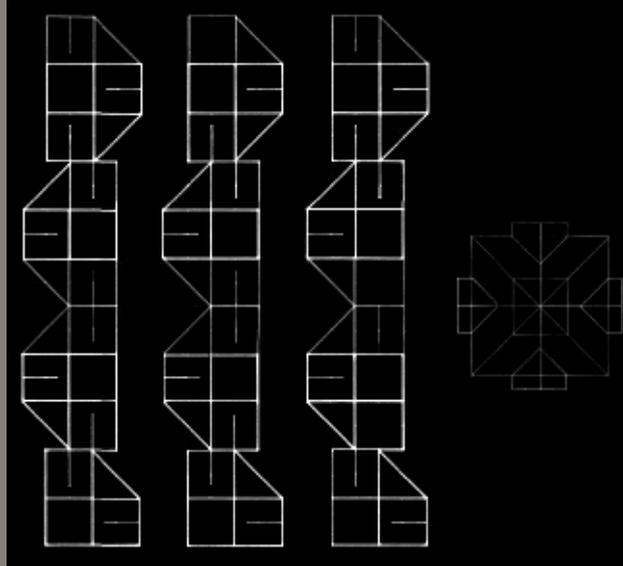


space becomes a light well

D E V E L O P M E N T  
o f t h e s i t e

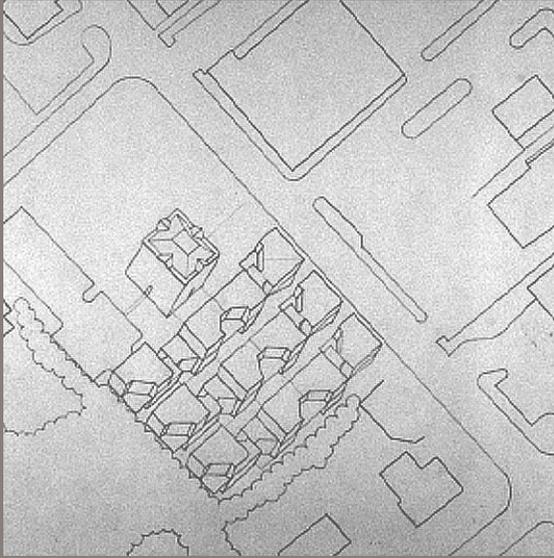
### III. PROJECT/PROCESS

regulating lines

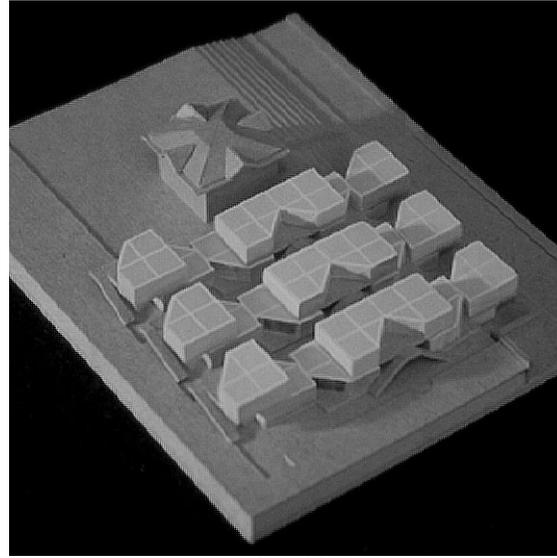


### III. PROJECT/PROCESS

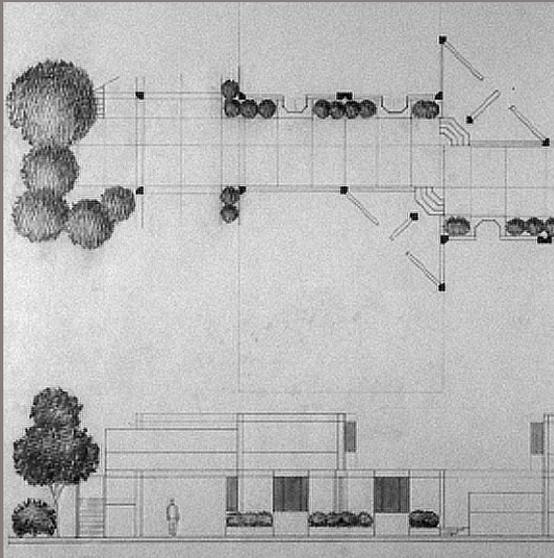
outdoor spaces and contextual relationships



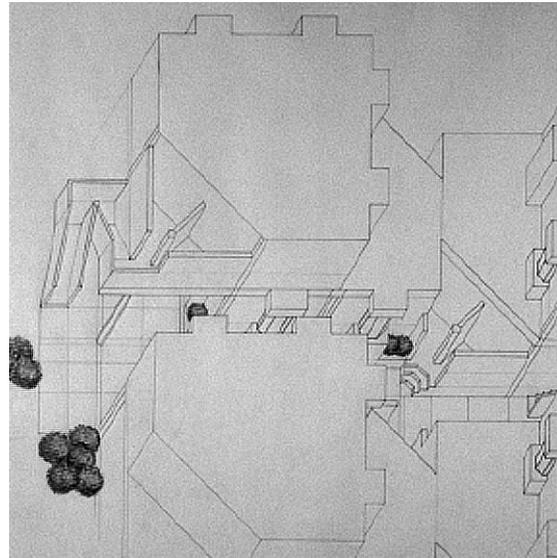
axonometric view showing site and immediate context



site model



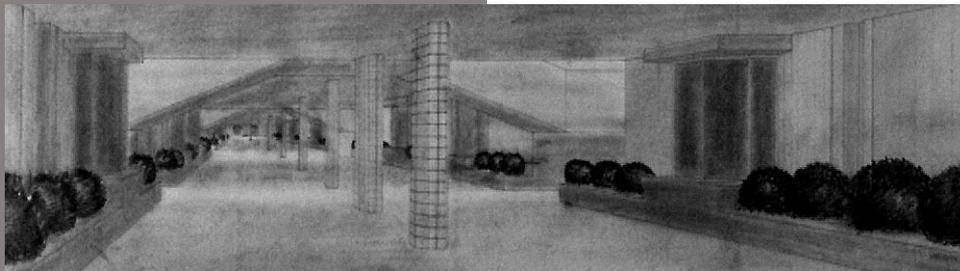
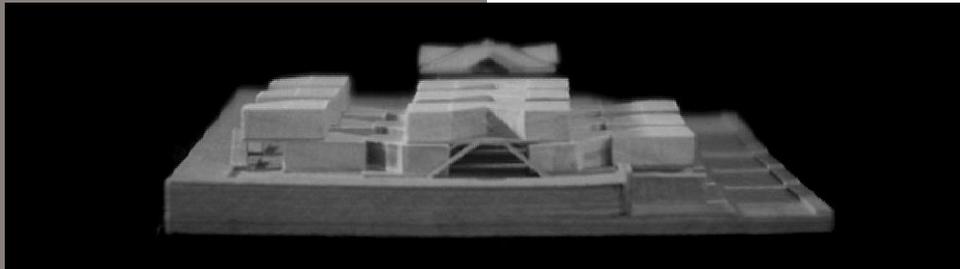
detailed plan and elevation of outdoor space



detailed axonometric view of outdoor space

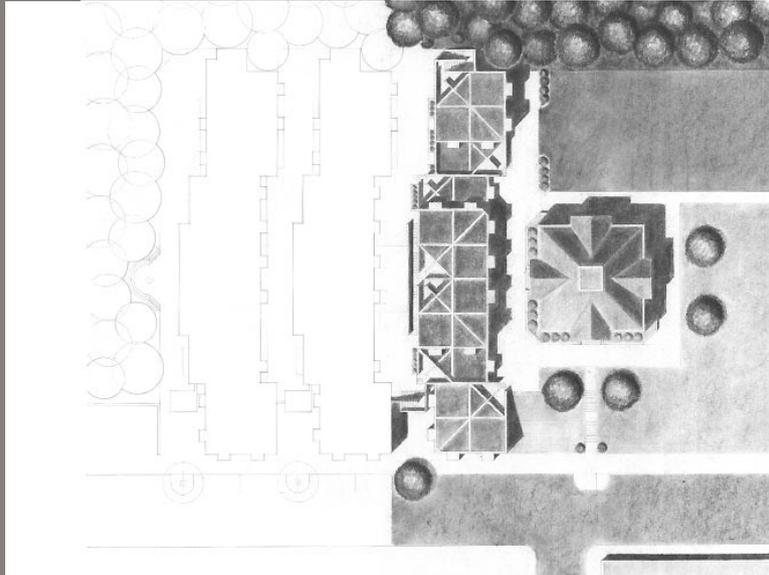
### III. PROJECT/PROCESS

axis



### III. PROJECT/PROCESS

site



site plan

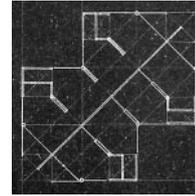
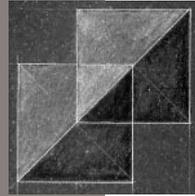
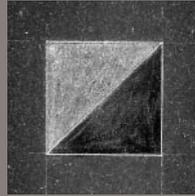


perspective view from street

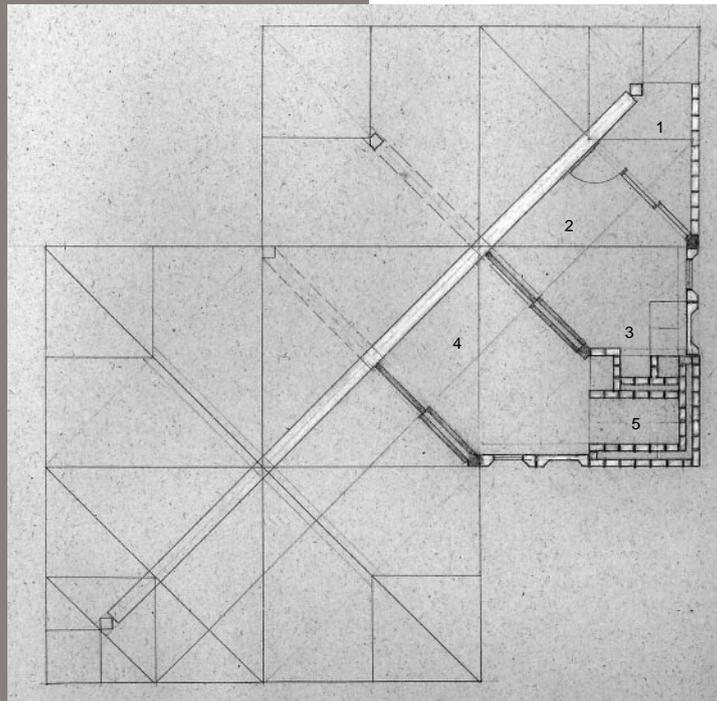
R E F I N E M E N T  
o f t h e s i n g l e u n i t & s i t e

### III. PROJECT/PROCESS

developing an architectural language out of the triangle - study 1



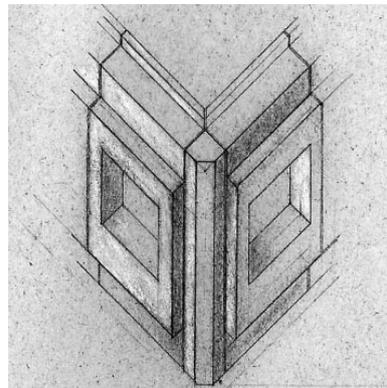
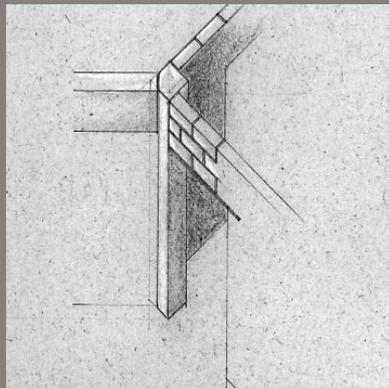
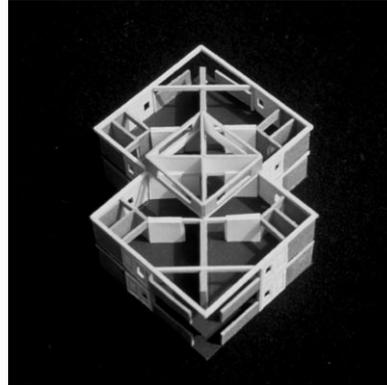
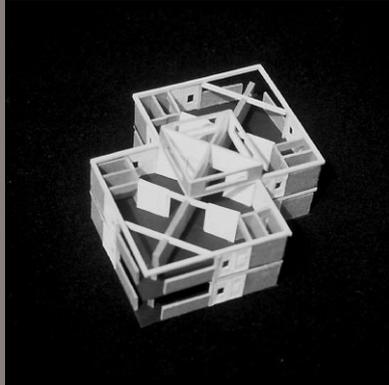
- hypotenuse makes its presence as an uninterrupted linear element
- acute angles serve as links to indoors or outdoors as well as adjacent units
- right angles act as structural footholds and contain service spaces



plan: 1. entry courtyard 2. living 3. cooking 4. sleeping 5. bathroom

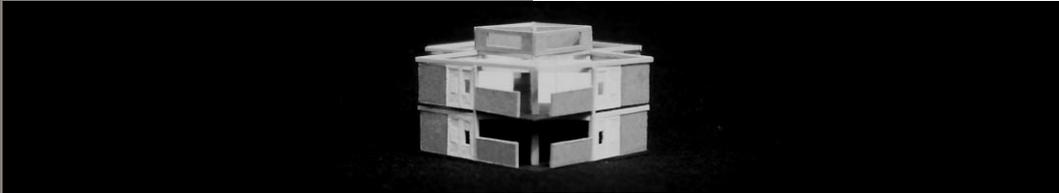
### III. PROJECT/PROCESS

study model and details

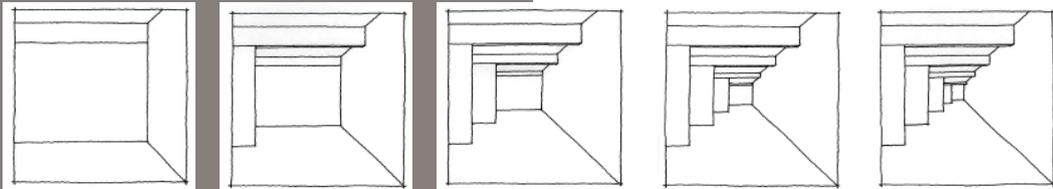


### III. PROJECT/PROCESS

perspective studies



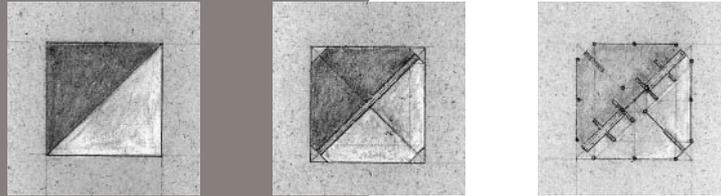
view of model along hypotenuse



interior perspective views along hypotenuse wall with partitions fully closed (far left) to fully open (far right)

### III. PROJECT/PROCESS

developing an architectural language out of the triangle - study 2

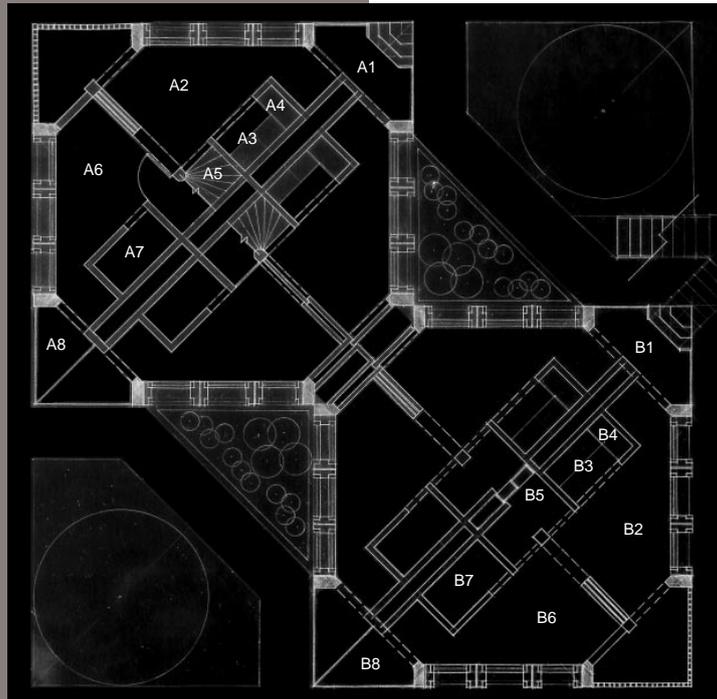


- hypotenuse makes its presence with its thickness  
it is essentially a thick wall containing the service spaces
- acute angles serve as links to indoors or outdoors
- right angle become links to adjacent units

#### Alternative A:

stairs contained within hypotenuse, linking units above and below

- A1 - entry porch
- A2 - living
- A3 - cooking
- A4 - mechanical
- A5 - stairs
- A6 - sleeping
- A7 - bathroom
- A8 - outdoor terrace



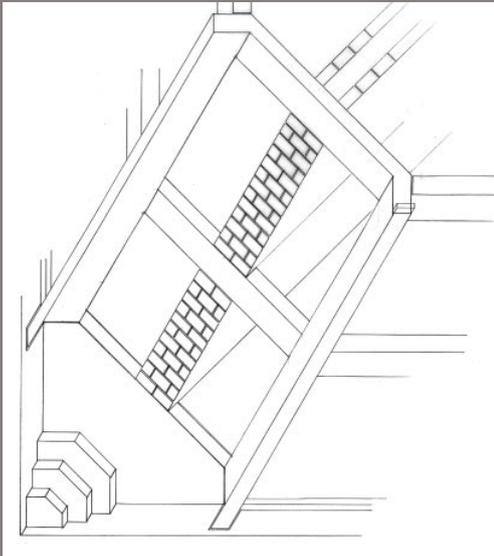
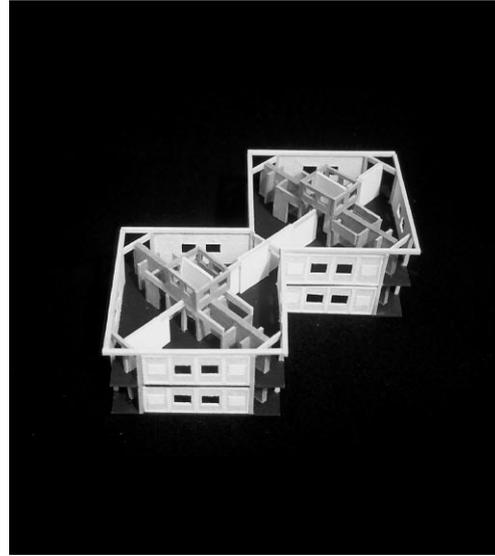
#### Alternative B:

sliding partition links adjacent units on same level, requiring an exterior stair

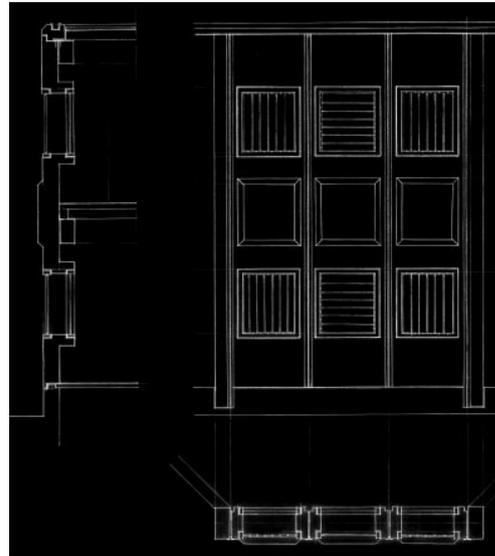
- B1 - entry porch
- B2 - living
- B3 - cooking
- B4 - mechanical
- B5 - sliding partition connecting adjacent units
- B6 - sleeping
- B7 - bathroom
- B8 - outdoor terrace

### III. PROJECT/PROCESS

study model and details



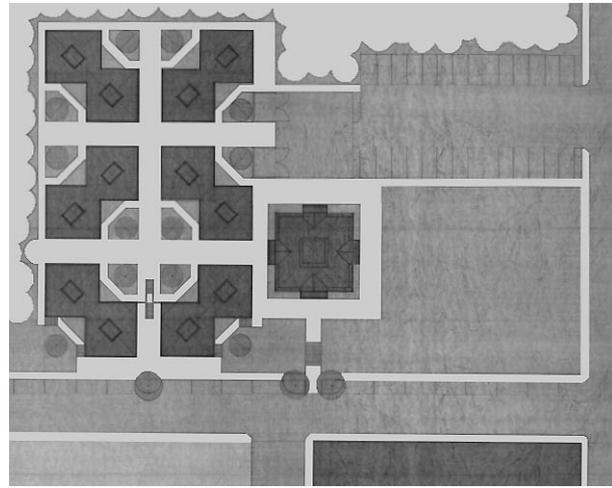
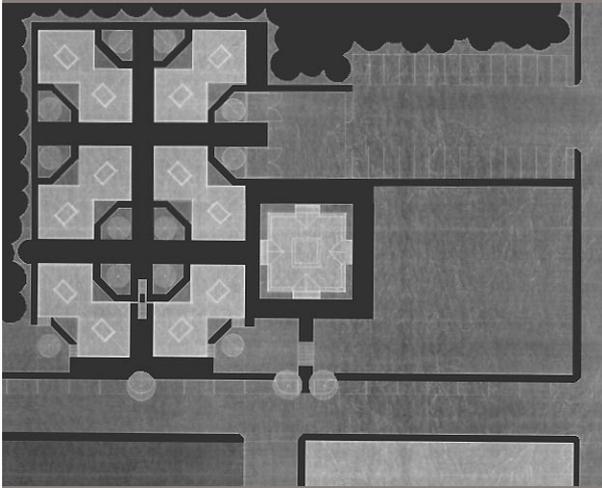
detail showing precast corner member



precast panel detail

### III. PROJECT/PROCESS

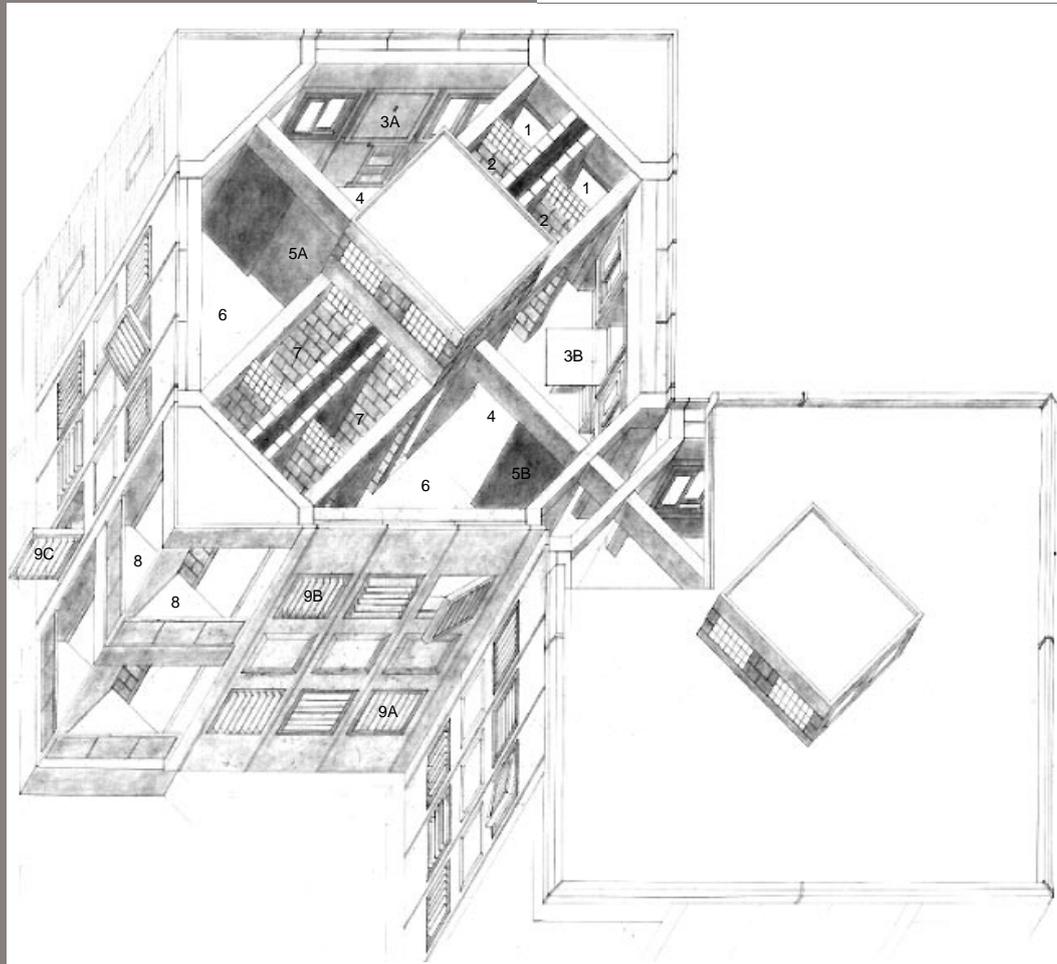
site



### III. PROJECT/PROCESS

detailed unit study

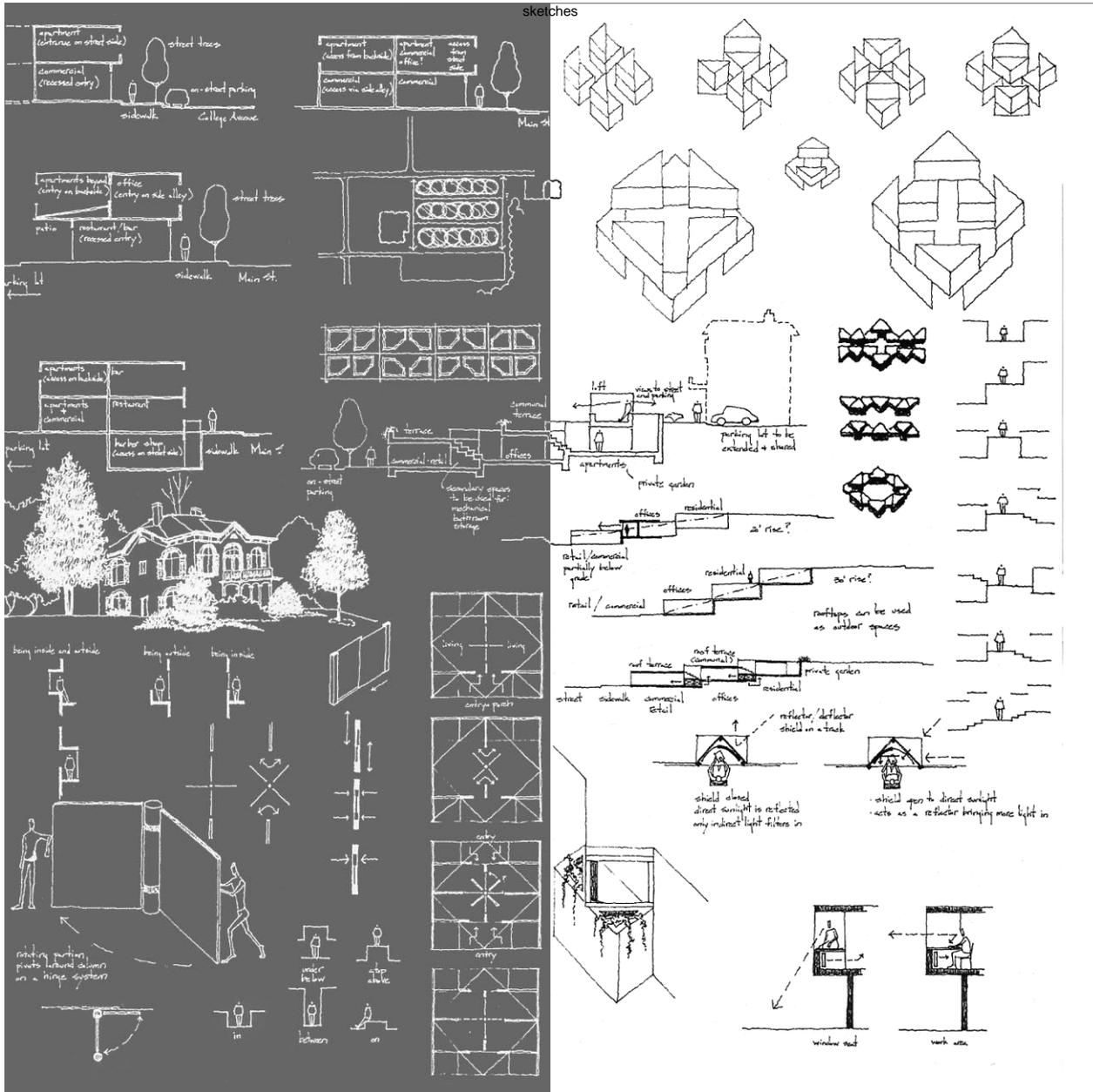
"...The liberated dweller, like the reader of poetry, is given many fragmentary beginnings and suggestions for meaningful experience, yet is a force who, through action, momentarily "completes" something basically incomplete."<sup>10</sup> - Henry S. Plummer, *Liberative Space*



1. entry 2. cooking 3A. dining table raised 3B. dining table lowered 4. living 5A. partition closed 5B. partition open 6. sleeping 7. bathroom  
8. outdoor terrace 9A. window louvers closed 9B. window louvers open 9C. window fully open

### III. PROJECT/PROCESS

sketches



#### IV. ENDNOTES

<sup>1</sup> Wurman, Richard S., "What Will Be Has Always Been: The Words of Louis Kahn," Rizzoli Books, New York, 1986, p. 29.

<sup>2</sup> Co, Francesco D., "Tadao Ando: The Complete Works," Phaidon Press Limited, London, 1995, p. 456.

<sup>3</sup> LeCorbusier, "Towards a New Architecture," Dover Publications Inc., New York, 1986, p.3.

<sup>4</sup> Overy, Paul, "DeStijl," Thames and Hudson, London, 1991, p. 113.

<sup>5</sup> Linley, David, "Extraordinary Furniture," Harry N. Abrams Publishing Inc., New York, 1986, p. 3.

<sup>6</sup> Hertzberger, Herman, "Lessons for Students in Architecture," Uitgeverij 010, Rotterdam, 1991, p.170.

<sup>7</sup> Co, Francesco D., p. 449.

<sup>8</sup> Knobel, Lance, "Botta Interview," Architectural Review, July 1981, Vol. CLXX, No. 1013, p. 24.

<sup>9</sup> Eyck, Aldo van, "Place and Occasion, Right Size, The Interior of Time," Forum, 1962-3, p. 43.

<sup>10</sup> Plummer, Henry S., "Liberative Space," JAE, Spring 1987, Vol. 40, No. 3, p.14.

## V. PHOTOGRAPHIC CREDITS

**p. 3:** Ward-Perkins, John, "Roman Architecture," Harry N. Abrams Publishing Inc., New York, 1977, p. 134.

**p. 4:** LeCorbusier, "Towards a New Architecture," Dover Publications Inc., New York, 1986, p. 77&80.

**p. 5:** Overy, Paul, "Rietveld Schroder House," MIT Press, Cambridge, 1988, p. 10-11.

**p. 6:** Holl, Steven, "Anchoring: Selected Projects 1975-1991," Princeton Architectural Press, New York, 1991, p. 148-9.

**p. 7:** Kitao, Harumichi, "Shoin Architecture in Detailed Illustration," Shokokusha Publishing Co., Tokyo, 1956, p. 87.

**p. 8:** Linley, David, "Extraordinary Furniture," Harry N. Abrams Publishing Inc., New York, 1996, p. 138-9.

## VI. BIBLIOGRAPHY

- Co, Francesco D., "Tadao Ando: The Complete Works," Phaidon Press Limited, London, 1995.
- Eyck, Aldo van, "Place and Occasion; Right Size; The Interior of Time," *Forum*, 1962-3.
- Hertzberger, Herman, "Lessons for Students in Architecture," Uitgeverij 010, Rotterdam, 1991.
- Holl, Steven, "Anchoring: Selected Projects 1975-1991," Princeton Architectural Press, New York, 1991.
- Kitao, Harumichi, "Shoin Architecture in Detailed Illustration," Shokokusha Publishing Co., Tokyo, 1956.
- Knobel, Lance, "Botta Interview," *Architectural Review*, July 1981, Vol. CLXX, No. 1013.
- LeCorbusier, "Towards a New Architecture," Dover Publications Inc., New York, 1986.
- Linley, David, "Extraordinary Furniture," Harry N. Abrams Publishing Inc., New York, 1996.
- Overy, Paul, "DeStijl," Thames and Hudson, London, 1991.
- Overy, Paul, "Rietveld Schroder House," MIT Press, Cambridge, 1988.
- Plummer, Henry S., "Liberative Space," *JAE*, Spring 1987, Vol. 40, No. 3.
- Ward-Perkins, John, "Roman Architecture," Harry N. Abrams Publishing Inc., New York, 1977.
- Wurman, Richard S. "What Will Be Has Always Been: The Words of Louis Kahn," Rizzoli Books, New York, 1986.

VII. VITA

**Michael Malofiy**

March 20, 1972

Fall 1995 - Summer 1998:  
Virginia Polytechnic Institute & State University  
Blacksburg, VA  
degree: Master of Architecture

Fall 1990 - Spring 1995  
Pennsylvania State University  
University Park, PA  
degree: Bachelor of Science in Landscape Architecture