

LIGHT AND THE SPIRIT OF PLACE
Case Study: The Design of a Small Public Library

by

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Thesis Advisor

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Departmental Committee for Graduate Students

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MASSACHUSETTS INSTITUTE
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SEP 27 1979

LIBRARIES

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by Sally W. Harrison

Submitted to the Department of Architecture on June 19, 1979 in partial fulfillment of the requirements for the Degree of Master of Architecture

Massachusetts Institute of Technology

Abstract

The thesis uses the design of a small public library as a vehicle for the exploration of natural light in architectural space. A process for designing and evaluating the design of light spaces has been formulated. Three major devices are used. First, a "light program" matches the designer's intentions about the desired character of each program space with specific qualities of natural light. Second, references of existing light places are gathered. These reference images exhibit some or all aspects of the desired light conditions, and are used as a spring-board for design. Third, large scale light models are built as devices for observing and evaluating design projections. Criteria set up through the "light program" are referred to as the basis for evaluations of the design.

Thesis Advisor.....

Chester Sprague
Associate Professor of Architecture

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Introduction

It is almost impossible to separate the visual perception of space from the quality of the light which inhabits it. Space limited by material is revealed through light; light in space, in turn, is generated by the form. The mutual reciprocity of these two opposite elements - the one concrete and static, the other immaterial and infinitely suggestible - makes the study of one without an understanding of the other incomplete. The study of architectural design tends to be heavily weighted toward the manipulation of form with only some notions about the quality of light. This is understandable since form-making is the more tangible task. Yet, in built reality the quality of light has enormous evocative power, not only in defining and revealing form, but in determining the spirit of the place.

This thesis is an attempt to investigate the dialogue between light and form, and to begin to use natural light as an expressive design tool. In order to direct and confine the exploration, a specific architectural design problem was used as the medium of the project. Decisions about light quality were subject to particular conditions of use and of intentions about the

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character of the place. Decisions about form were made primarily in service to the ideas about light.

Many building types or spaces could have served as the vehicle for this exploration, but it was important to be committed to making a special place. I chose a small public library as the design problem. There are two basic reasons behind this choice. First, because the central activity of the building is a visual task, the problem contains in it important requirements for light needs. Second, I have long been intrigued by this building type as a place of physical repose and mental activity: the library needs a special atmosphere of peacefulness and quiet. The mood or spirit of place must be strong enough to support this internalized activity of reading and meditation, and the evocative power of light can play a significant role in its creation.

To make an architectural design with natural light as the focal issue required particular attention to the process by which decisions were made. The process which evolved had four basic parts: first, making clear of my intentions about the place and its spirit; second, considering how these intentions related to light quality; third, projecting these "light intentions" into "light forms"; and fourth, finding a technique through which I could explore and evaluate these projections.

I began by studying historical precedents in library design as a means of reviewing the changing attitudes toward the library as a public institution. This gave me a frame of reference for clarifying my own attitudes toward what kind of a place the small urban library should be. I examined several current programs for library buildings in the range of 15,000 - 25,000 square feet in order to provide for myself a typical program to work from. Several of the key spaces were then carefully considered each in terms of its desired qualities of place and light. Images of existing places which illustrated some of these qualities were collected. Some were analyzed as references for design; some were left as image/impressions.

A "light program" was constructed as a tool for synthesizing and particularizing specific ideas and images about spaces and their light qualities. Several generic light-related issues were identified and applied to the selected elements of the space program. This matrix resulted in a kind of performance standard which could apply to a range of design solutions. A list of physical determinants for each light issue was made as an aid in generating forms and later in evaluating them.

The site is a rectangular 30,000 square lot adjoining a park in a medium density residential/institutional neighborhood in Cambridge, Massachusetts. The

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details of the context were not of major importance. Since the problem was set up to address the issues of the inner world of the library, the site-related variables which I dealt with were limited to sun direction, views, and relationship of the building to the street edges and to the park.

The schematic design of the building was generated from these site factors as well as from functional issues of library planning. Although the latter was not dwelt heavily upon, it was important in providing a tangible point of departure for the design and the light exploration. The images and references gathered earlier helped to generate specific light forms which could then be studied in models.

Large scale light models were employed as the major design tool. Materials used in the models were chosen to roughly approximate - in texture, color, and transmittance - the appearance of actual building materials. Model photographs taken under natural light conditions, provided a fairly accurate rendition of the quality of the light in the space. From these photographs evaluations and design projections were made. Although the criteria set up in the "light program" were a useful basis for analysis, specific design decisions were generated from a more complex and

subjective frame of reference relating more to images and feelings about a sense of place than to particular requirements.

Because of the limits of time and technical resources not all of the spaces in the building, nor all of the "light issues" could be explored. The preliminary imaging and light programming of all the parts was done. However, in-depth study of the actual light in the space through models was limited to the major reading space, the bookstack area, and the individual reading carrels and alcoves.

Intentions and Methodology

The Library as an Urban Place

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The history of the public library is rather brief. Until the French revolution collections of printed material were the exclusive valued property of either religious institutions or private individuals. The 19th century saw the flowering of education for the people and simultaneously the proliferation of centralized public libraries. Small public libraries began to spring up in Scandanavia, Northern Europe and America during the latter half of the 19th century providing access to general information for the inhabitants of small towns and outer edges of the city. In aspect these institutions were often miniaturized versions of the grand mid-city libraries - small but dignified monuments to civic pride.

This tradition continued through the early 20th century. In recent years however attitudes towards education, the value of books, and mechanization of retrieval systems have changed the quality of the small public library both in the city and in towns. The very positive wish to make information more broadly and easily accessible has been developed in newer libraries often at the expense of many fine qualities of place. Small libraries have begun to assume a "retail" identity in

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order to compete in a world where rapid, often thoughtless consumption of goods is the norm.

I believe that there is a great social need for a public place within the fabric of the city that does not encourage the frenetic activity that is everywhere outside the private domain. A library could be this place. To study and engage in another reality, to browse in the bookstacks on the chance of uncovering something new, or just to sit in peace and comfort - these are simple luxuries which should be given a public place. I feel therefore that the role of the library is not just to make information easily accessible to the public, but to offer also a place where the learning, discovery, and imagination associated with experiencing these resources are allowed to flower.

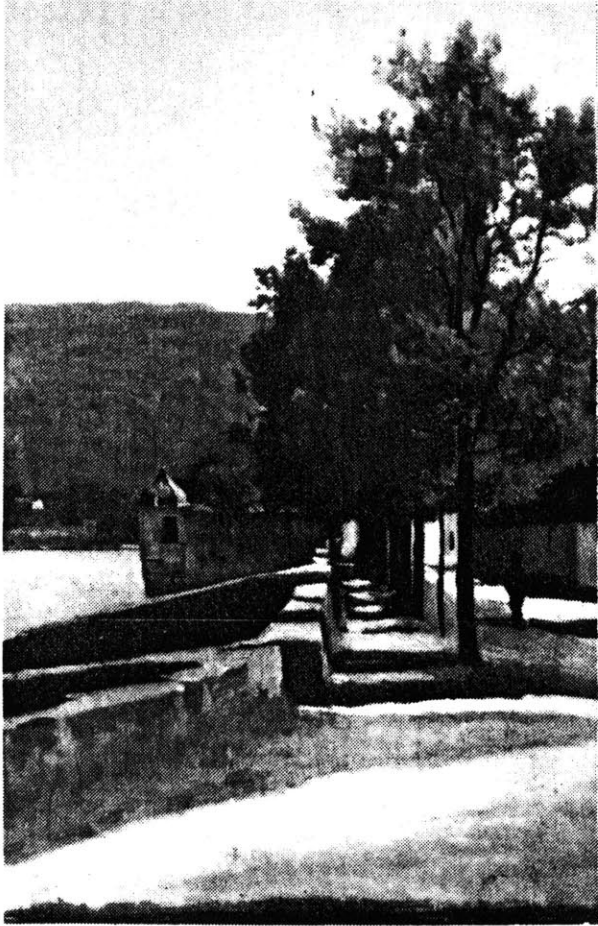
"Light Program"

For both generating and evaluating the light in service to these ideas about the spirit of the library, the "light program" was used as the primary tool. A preliminary statement of the intended character and function of each element of space programs was made as a guide to more specific considerations about light qualities. These intentions appear also as part of the matrix as reasons behind the light specifications. Two documents follow. The first is a list of generic "light issues" and their "physical determinants". The second is the "light program" matrix which applies these issues to several of the important spaces in the building program. Images of light and spirit of place associated with these spaces, as well as a brief description of the use and desired qualities of each space appear also with the "light program" matrix.

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LIGHT ISSUE	PHYSICAL DETERMINANTS
Amount of light needed for task "How many foot candles?" *(not tested)	.Size of light source .Shape of light source .Material of light source .Distance of working location from light source .Reflectance of interior walls/ceiling/floors .Reflectance of external surfaces
Views to outside through light source "What is the nature of the view? Active or disengaged?" "To whom is the view revealed? individual or collective?"	.Size of light source .Orientation of light source .Distance of light source from use area
Sunlight/diffuse light "How much of each?"	.Orientation of light source .Screening/shading devices .Material of transmitting membrane (glass, glass block, translucent panel)
Color of light "What kind?" *(not tested)	.Orientation of light source .Color of transmitting membrane .Color of reflecting surfaces inside and outside
Gradation of light from light source to use space "How much gradation?"	.Relationship of light source to walls; to floor; to ceiling .Depth of housing of light source .Reflectance of glazing bars; of housing of light source; of walls .Angle of housing of light source

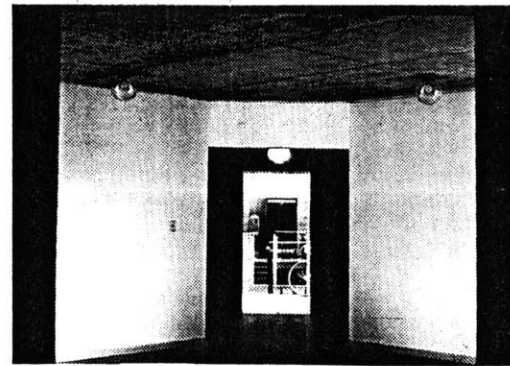
LIGHT ISSUE	PHYSICAL DETERMINANTS
Uniformity/accentuation of light in space "To what degree?"	<ul style="list-style-type: none"> .Number of light sources .Location of light source(s) .Size of light source(s) .Reflectance of walls; floor; ceiling .Direction(s) from which light comes
Visibility of light source to user "How and when visible?"	<ul style="list-style-type: none"> .Location of light source with respect to walls; ceiling .Location of light source with respect to direction of user movement
Light transition between interconnected spaces "How continuous or distinct is the transition? Abrupt, dramatic, distinct, graded, or continuous?"	<ul style="list-style-type: none"> .Differential ambient brightness .Differential brightness of wall planes .Direction(s) from which light comes .Differences in ceiling and floor levels .Amount of wall definition between spaces



1.



2.



3.

Images

Entry/Circulation

Entry/Exit

Waiting

Book check/information

Exhibits

Conversation

Fig. 1. Detail from Corot landscape. Movement along the edge of a bright field is punctuated by an alternating pattern of light and shadow. (1)

Fig. 2. Somerset Bath. Circus No. 10. Light from concealed source at landing washes stair wall accentuating direction of movement and "target" place from entry vestibule. (2)

Fig. 3. Bryn Mawr Dormitory by Louis I. Kahn. Alternating bright and dark spaces along axis of movement reveals the organization of the building and differentiates the spaces.

This zone provides the transition between the active and extroverted nature of the street and the quiet and more introverted nature of the library. On one level, it is a buffer between the two very different worlds. On another, it is a place of orientation and access to the book collection and other uses of the building.

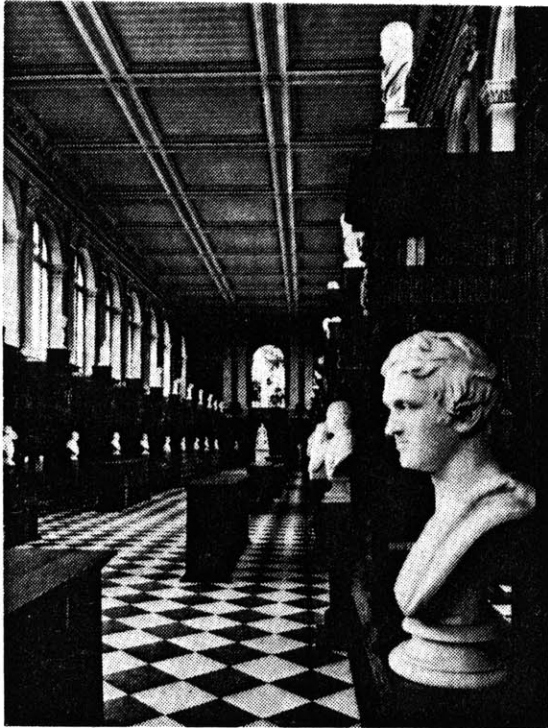
The entry area is thus a kind of mixing chamber which contains in it elements of the different places which it brings together. It is also about movement and a process of selection.

Circulation or movement spaces in the building have similar transition functions, and can be considered in the same light as the entry zone.

LIGHT ISSUE	PROJECTED NEED	REASON
Amount of light	May range from 10 ft. -c to 500 ft. -c.	Zone of transition from bright outside to dim interior
Views to outside	Views of street diminish as user penetrates more deeply into building Collectively experienced views	Transition zone; needs gradual change of focus Most public part of building
Sunlight or diffuse light	Mixture of the two types; diffuse light more dominant deeper inside the building	This space is primarily movement-related, and does not need to support long-term visual concentration
Color of light	Mixture of warm and cool; cool colors predominate inside building	Transition from active zone to quiet, cerebral use place
Gradation of light from light source to space	Medium control, but avoid glare	Movement sequence should be punctuated with light to enliven and highlight the progression
Uniformity/accentuation	Accent the control desk; create rhythm of movement	See above

LIGHT ISSUE	PROJECTED NEED	REASON
Visibility of light source	May be visible	Clarity of space
Light transition	<p>Street to Entry: smooth</p> <p>Entry to Stacks: smooth</p> <p>Entry to Lounge: smooth/ distinct</p> <p>Entry to Reference: distinct</p>	<p>Adjustment of eye to change in light level: orientation</p> <p>Allow for possibility of easy flow of movement from street to stacks</p> <p>Part of public domain but not as active</p> <p>Special place within a special place</p>

22.



(3)

Images

Bookstacks/Circulating Materials

23

Search for a specific book(s)

Search for books of a general topic

Non-directed browsing

Incidental reading and writing

The purpose of the bookstacks is to organize a relatively large collection of written material such that a specific book, author, or topic of information may be easily found by the library user. The open stack also permits the user to be casual or directed in his search, and to briefly use, or make choices about the books as he finds them. This process of selection demands a high degree of concentration on the part of the user, and the space should not provide other distractions.

Thus stacks must support simultaneously movement and pause, and should operate as a connective tissue between the major circulation system and specific places to be.

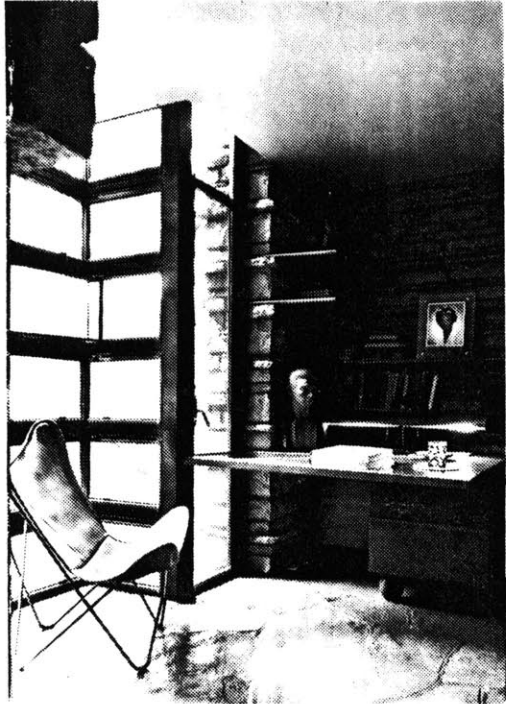
*Trinity College
Library by Sir
Christopher Wren.
Stacks are perpen-
dicular to the major
light source.*

(4)

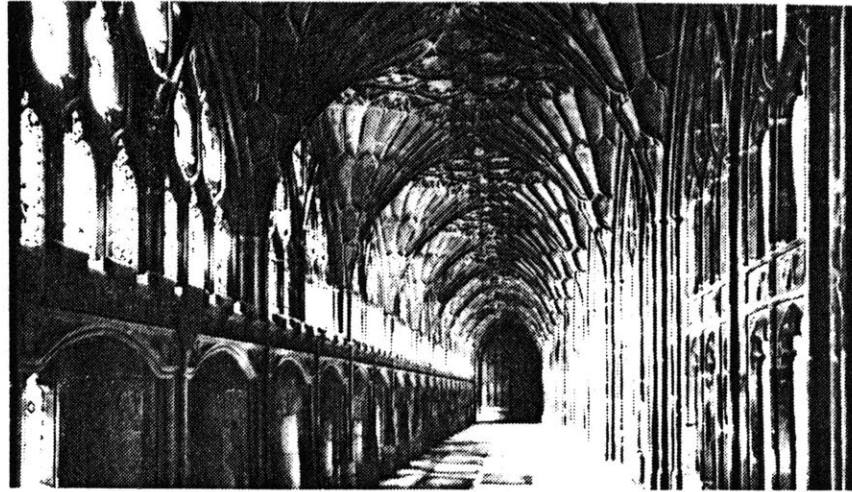
24.

LIGHT ISSUE	PROJECTED NEED	REASON
Amount of light	40 to 60 ft. -c.	Visual task requirement
Views to outside	Disengaged	Emphasis on books
Sunlight/diffuse light	All diffuse	Visual task predominant
Color of light	Cool-ish	Clarity; cerebral task
Gradation of light	Maximum gradation	Reduce brightness differentials which would attract attention to light source
Uniformity/accentuation	Maximum uniformity of light from floor to ceiling; people and objects should not cast shadows	Visual task requirement
Visibility of light source	May be visible, but should not attract attention	Directness and simplicity of space use; light source is not meant to intrigue user
Light transition	<p>Bookstack to Entry/ Circulation: continuous/ graded</p> <p>Bookstack to Carrels: graded/distinct</p> <p>Bookstack to Reference: distinct/dramatic</p>	<p>Easy access to stacks</p> <p>Privacy of carrels</p> <p>Distinguish borrowing function from in-house use</p>

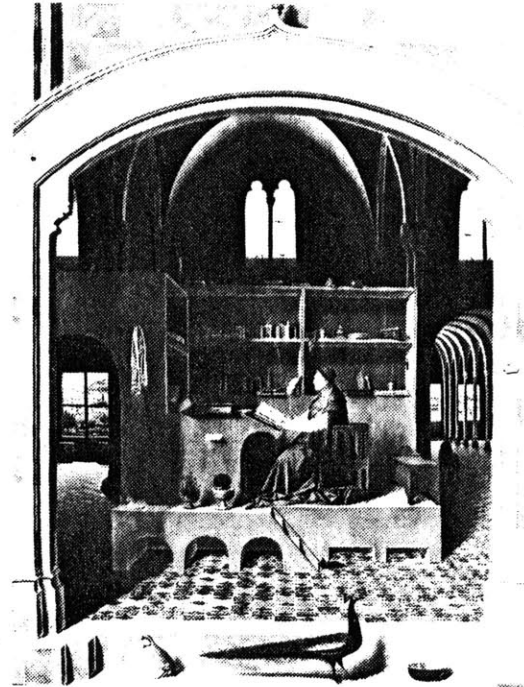
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1.



2.



3.

Images

Carrels

Intensive reading

Intensive writing

- Fig. 1. Study at "Falling Water" by Frank Lloyd Wright. View to outside from an upper level.* (5)
- Fig. 2. South Walk of the Cloister of Gloucester Cathedral. Individually lit study alcoves for monks.* (6)
- Fig. 3. "St. Jerome in his Study" by Antonella de Messina. Typical relationship of carrel user to reading material, and of carrel enclosure to a larger context.* (7)

The purpose of the carrel is to provide for a single person a place where needed materials are directly within reach. This enables the user to engage in long periods of uninterrupted work. The location and design of these carrel spaces should reinforce the highly individual and internalized nature of the activity; and also should provide connections to a larger context as a source of relief from intense concentration.

28.

LIGHT ISSUE	PROJECTED NEED	REASON
Amount of light	50 ft. - c. <u>+</u>	Visual task requirement
Views to outside	Disengaged Carrel user controls view	Restful; connected to, without active engagement with, outside world Privacy of carrel
Sunlight/diffuse light	Diffuse light	Even lighting of reading surface
Color of light	Warmish	Sense of physical comfort
Gradation of light	Maximum	Avoidance of glare
Uniformity/accentuation	Desk surface should be evenly lit	To avoid visual fatigue or disturbance for long- term study
Visibility of light Source	Visible to carrel user and part of architecture of carrel Not completely visible from outside carrel enclosure	Carrel scaled to be one- person environment User "owns" the carrel
Light transition	Carrel to Bookstack: distinct/graded Carrel to Entry/ cir- culation: distinct	Sense of separation with easy physical access Carrel enclosure should contain its own light but may borrow light from circulation space

30.



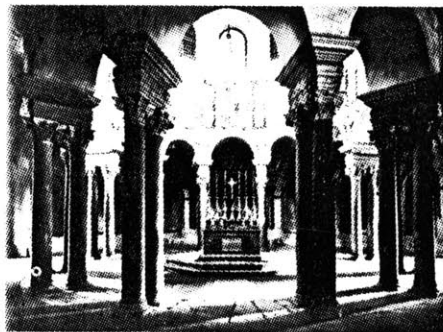
1.



2.



3.



4.

Images

Reference Area/Non-Circulating Materials

Quick information retrieval

Long term study and note-taking

Brief conservation

Fig. 1,2. Bibliotheque Nationale, by Henry La Brouste. The tent-like domes lit by oculi seem to float, giving a sense of reading out of doors, beneath the clouds. (8)

Fig. 3. Clouds

Fig. 4. Santa Costanza, Rome. The altar space is given a sense of specialness by the colonnade which surrounds it and screens its light source from view from outside. (9)

Since reference books are non-circulating, they are meant to provide a body of general information which is always available to the public. The idea is that these materials are a shared community resource: they are used exclusively in the library. The permanence of this collection gives the library its meaning as a public place. The coexistence of the individual and the group makes the reference area almost a paradigm of the whole building, and suggesting that it could serve as a core or centering point of the library building. The emphasis in this area, like in the carrel, is upon working with rather than looking for books. Yet this type of study place is significantly different from the carrel as it is a communal area where a number of people simultaneously use a variety of different materials. Therefore the problem is to satisfy the individuals' needs for concentration within a collective context.

LIGHT ISSUE	PROJECTED NEED	REASON
Amount of light	40 - 60 ft. -c.	Visual task requirement
Views to outside	Disengaged Collectively experienced view	Emphasis is on collectivity, centrality
Sunlight/diffuse light	Mostly diffuse light; some sunlight is acceptable if it does not strike work surfaces	Must allow for maximum ease of vision, but sunlight may provide visual variety
Color of light	Warmish	Home-like; sense of physical comfort for long-term work
Gradation of light	Maximum	Avoid glare
Uniformity/accentuation	Uniformity desirable; no one spot accentuated Objects and people may cast shadows, but not on work surfaces or book shelves	Emphasis on a collective and unifying light-form: the reference area is the "heart" of the library Visual task requirement

LIGHT ISSUE	PROJECTED NEED	REASON
<p>Visibility of light Source</p>	<p>Visible from within space; concealed from view from without</p>	<p>As a microcosm of the whole library, the place explains itself from inside; and it has a sense of specialness from outside</p>
<p>Light transition</p>	<p>Reference to Entry/ Circulation: distinct/ dramatic</p> <p>Reference to Bookstack: graded</p>	<p>Sense of specialness needs emphasis to induce quiet, greatest need for quiet in collective work area</p> <p>Stacks are a kind of out-growth of the reference area</p>

34.



Images

Periodical Lounge

35.

Casual reading or writing
Time-killing/ milling about
Conversation
Smoking
Napping

*City Hall Gothenburg,
Sweden, by E. G.
Asplund. Continuity
between indoors and
outdoors achieved
through dappled pat-
tern of light falling
on the floor at the
edge of the space.*

(10)

This is the area of the lowest need for internal concentration, and where possibilities for interaction among users is the greatest. This space in the library functions also as a "public living room". It may offer a warm and comfortable place to sit for elderly or indigent persons; it may be a quiet lunch-hour place of refuge for a working person; or a casual meeting place for teenagers who use the library for their school work. Comfort, cheerfulness and variety of experience are desirable qualities of this space.

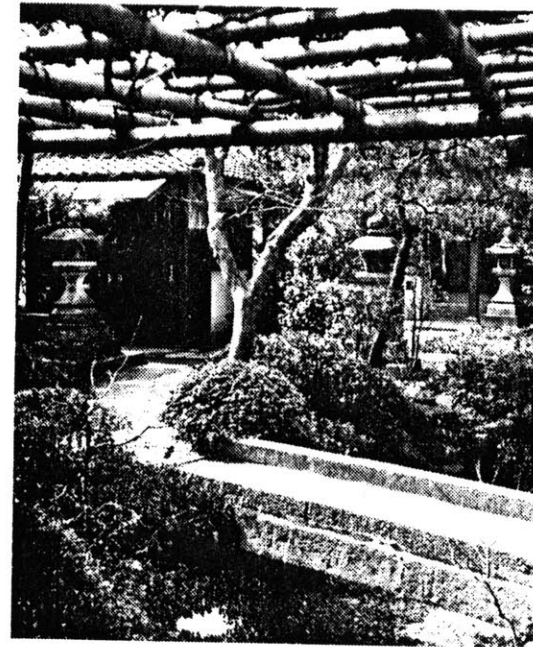
LIGHT ISSUE	PROJECTED NEED	REASON
Amount of light	20 - 500 ft. -c.	Casual, variety of needs
Views to outside	Medium engagement Collective and individual views	Low requirement for individual concentration Variety of activities
Sunlight/diffuse light	Mostly diffuse light; some sunny areas	Range of activities; primarily reading; cheerful, relaxed and varied atmosphere
Color of light	Warm	Cheerful
Gradation of light	Full range	Casual, differentiated use-space
Uniformity/accentuation	Some accent given to sitting places along edge within a generally bright field	Strong light connection between outdoor space
Visibility of light source to user	Visible from within and from without	A place of strong connections to outdoor space; and an open, inviting place within library building
Light transition	Lounge to Garden: graded/continuous Lounge to Entry: graded	Indoor extension of garden Casual public use; but needs some distinction



1



2.



3.

Images

Garden

Reading

Story-telling

Lounging

Conversation

Fig. 1. Medieval painting. The quality of an "outdoor room" is depicted here. A variety of casual activities, including reading beneath a tree, take place simultaneously.

(11)

Fig. 2. Gazebo-like shelter in a Japanese garden. A simple structure provides shelter from the sun with a view to the rest of the garden.

(12)

Fig. 3. Trellis from Japanese garden. Paths are given partial shelter by trellises.

(13)

The purpose of this area is to provide an outdoor room for casual use in warm weather, as well as a kind of serene view-place for the building from the inside. To be used for reading it must be furnished with reading places sheltered from the direct sun. These may be simple, as a bench beneath a tree; or they could be actual built structures like a gazebo. However, since the choice to read outside also implies a wish to engage somehow with the natural environment, the form and quality of the place should not entirely exclude the possibilities of experiencing changes in the weather.

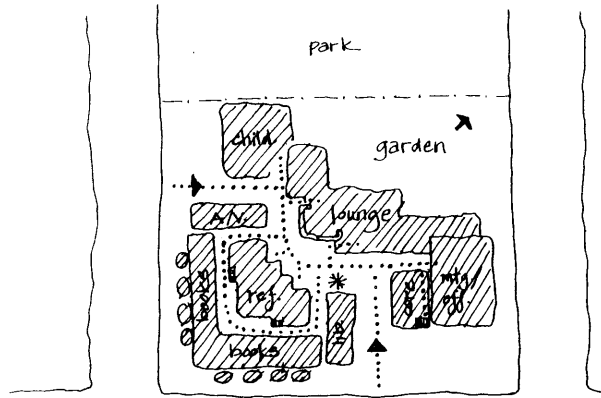
A balance of connectedness with a larger context and a sense of containment is important to maintain. (Since the use and form requirements are so varied and casual, the light program issues cannot apply.)

40.

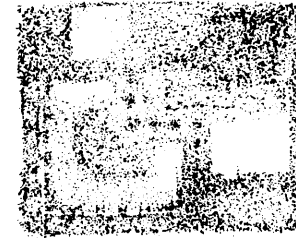
Design

This chapter is a presentation of the final design of the library. It represents the last phase in a process of design and evaluation which is documented in the last chapter. The first part of this chapter - "Site and Building Organization" - includes diagrams and drawings showing the schematic light and architectural design of the building as a whole. The second part focuses on three of the important library spaces: the main space which contains the Book Stacks, Reference Area and some circulation zones; the first floor edge condition which is made up of a series of three to four person reading alcoves; and the second floor edge condition which houses the individual study carrels. These spaces are described by photographs of light models and large scale partial sections and/or plans and elevations.

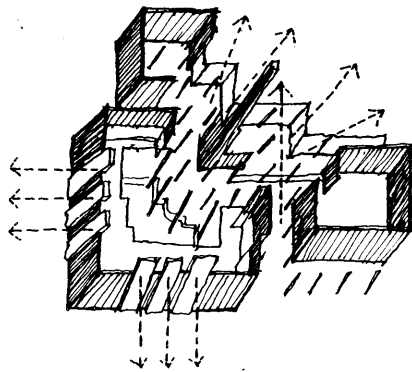
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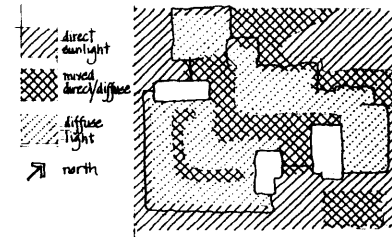
Use and Movement



Light Intensity

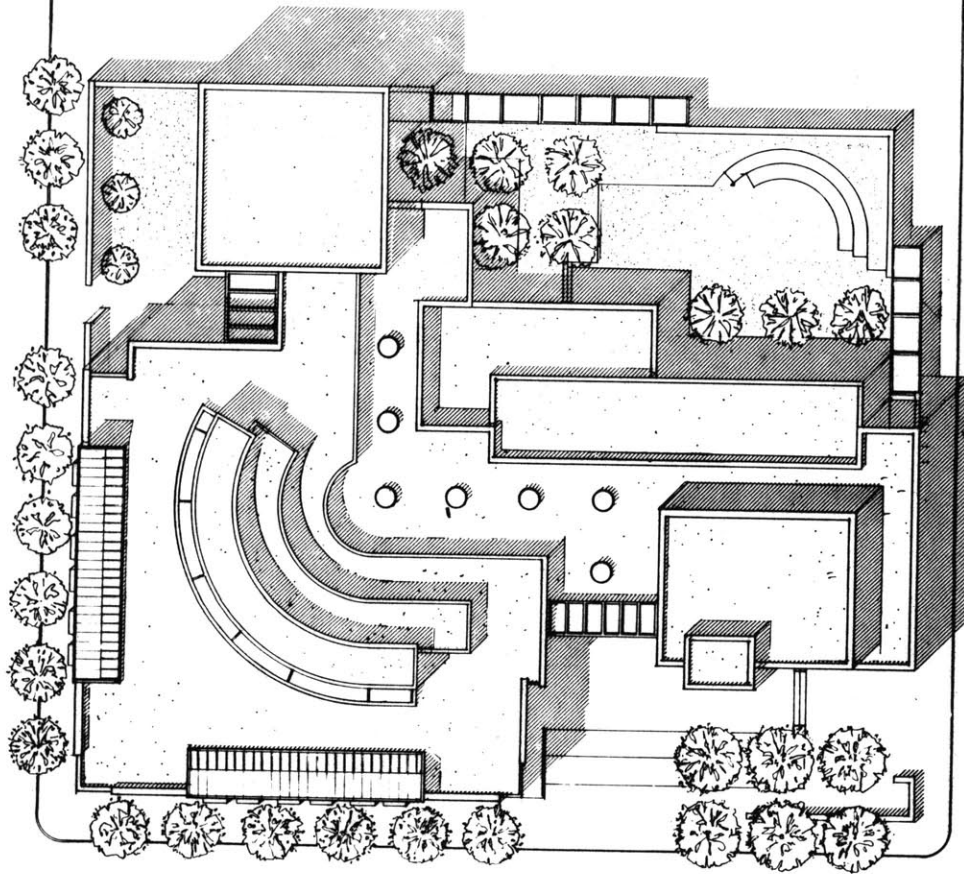


Enclosure and Views

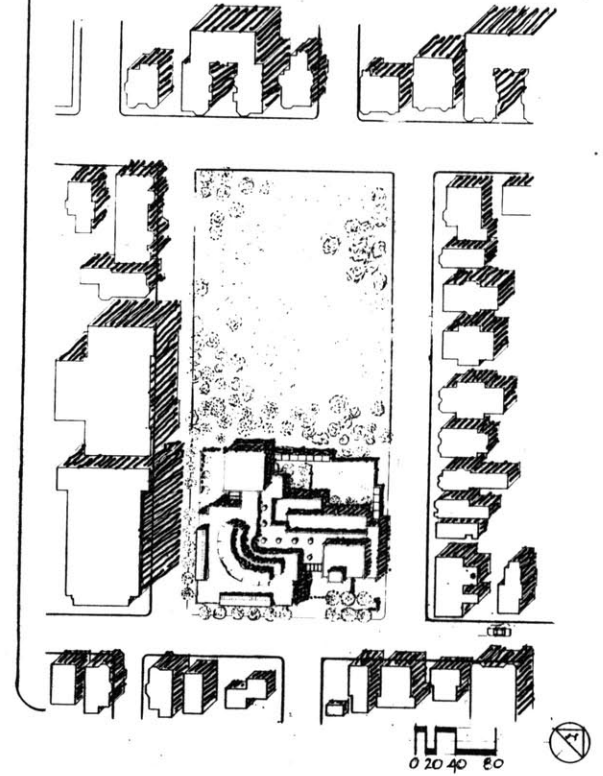
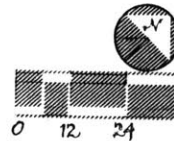


Sunlight/Diffuse Light

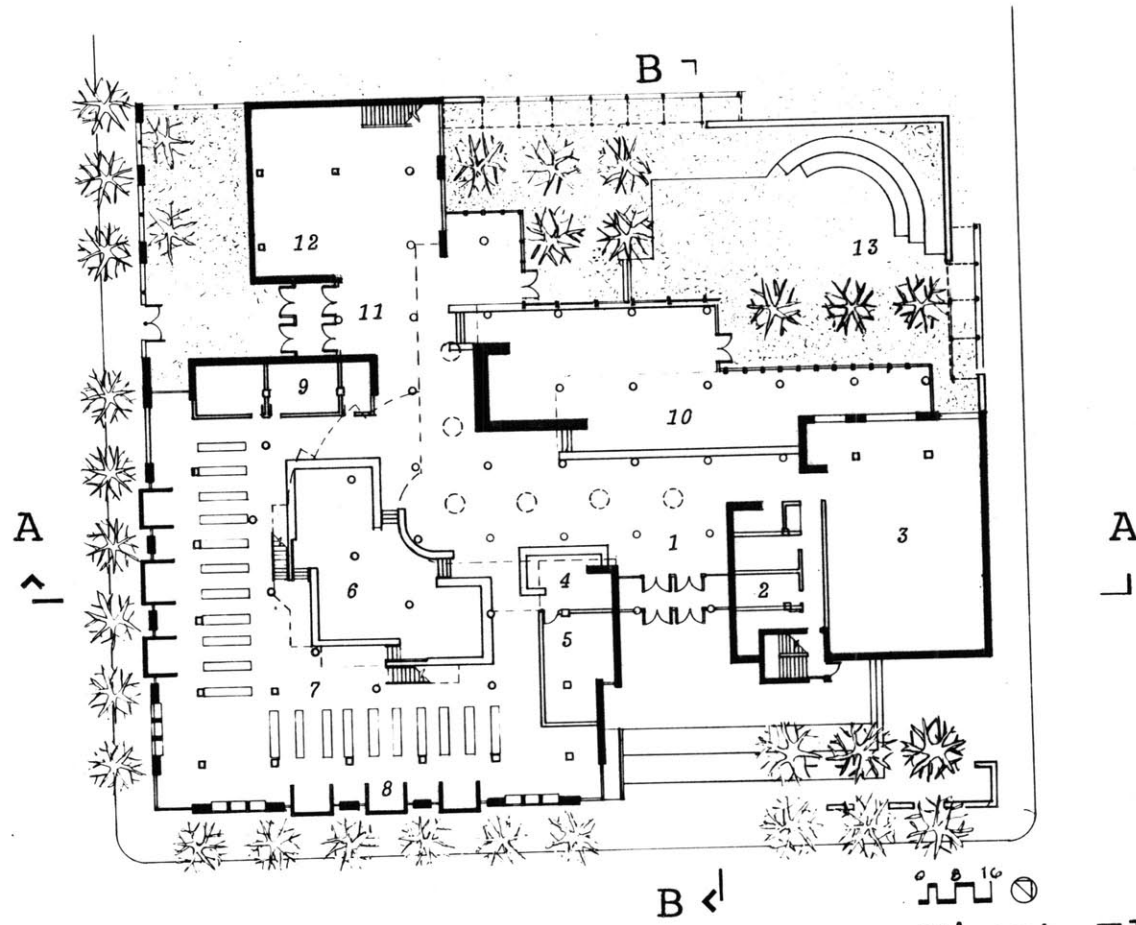
Site and Building Organization



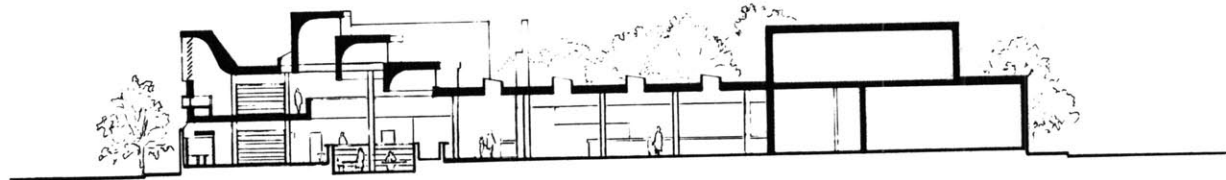
Roof Plan



Site Plan

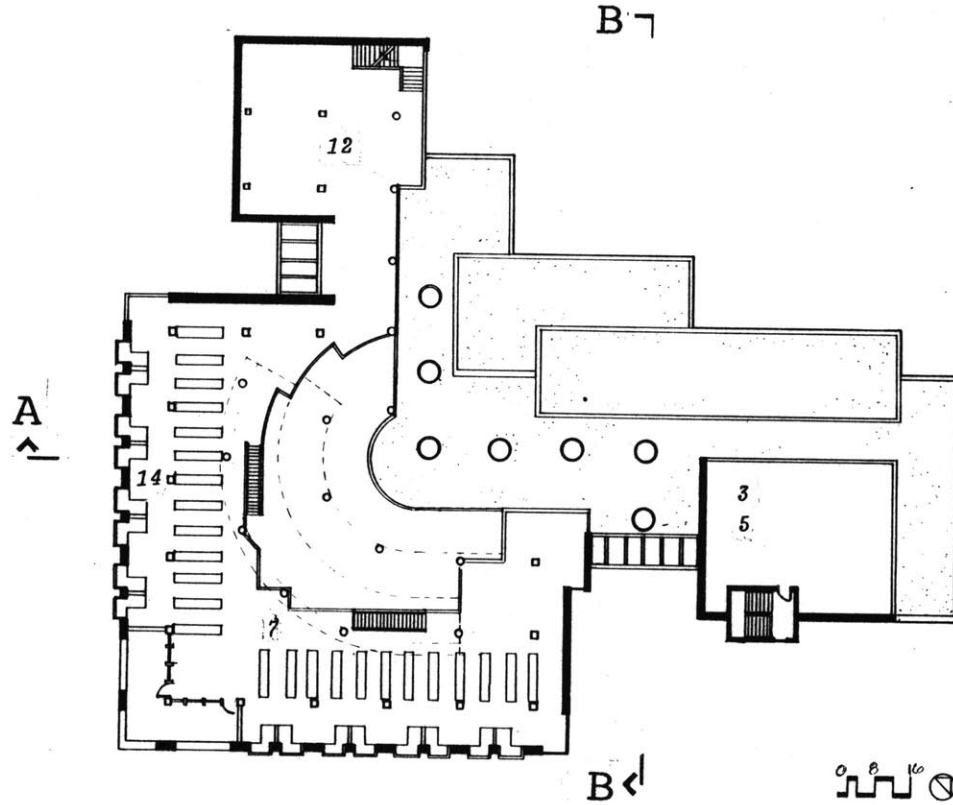


First Floor Plan

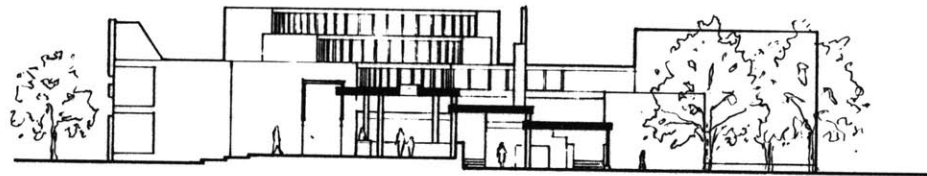


Section AA

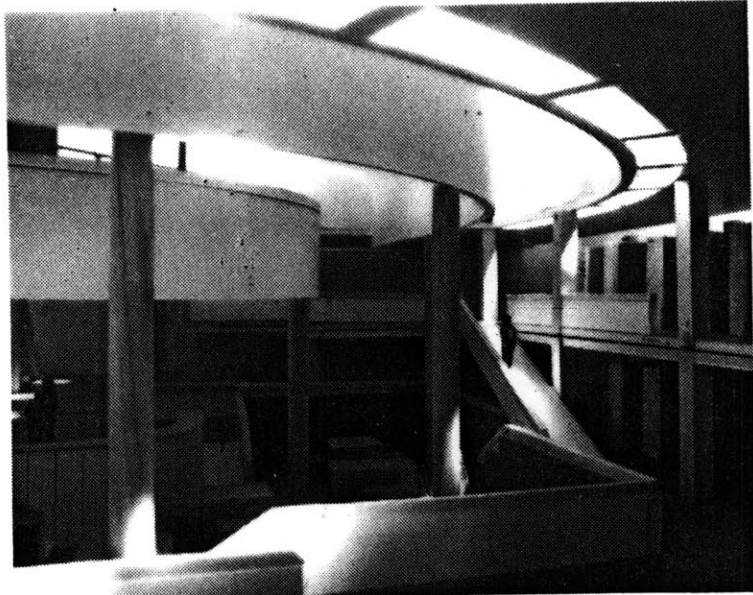
- 1. *Entry*
- 2. *Service Core*
- 3. *Meeting Room*
- 4. *Book Check*
- 5. *Librarian*
- 6. *Reference*
- 7. *Bookstacks*
- 8. *Reading Alcoves*
- 9. *Audio-Visual*
- 10. *Lounge*
- 11. *Childrens Entrance*
- 12. *Childrens Library*
- 13. *Garden*
- 14. *Carrels*



Second Floor Plan



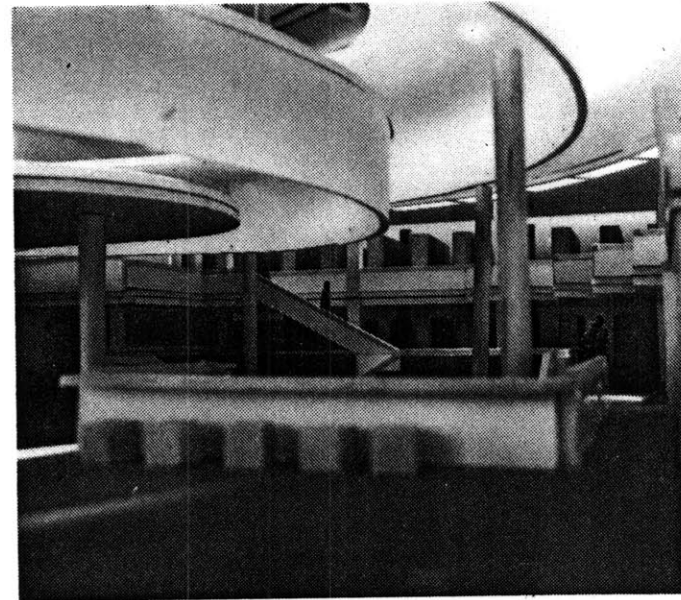
Section BB



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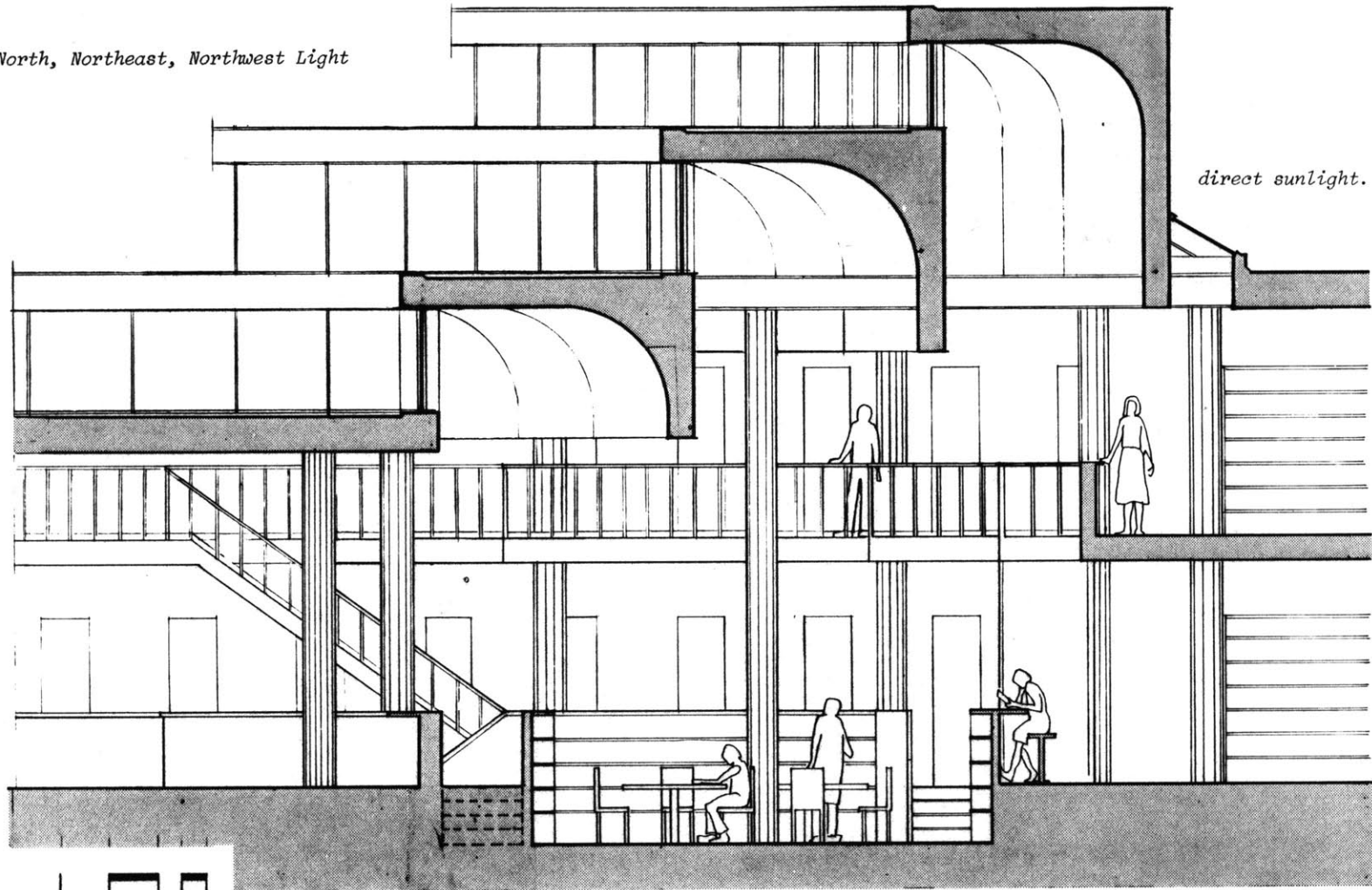
2.



3.

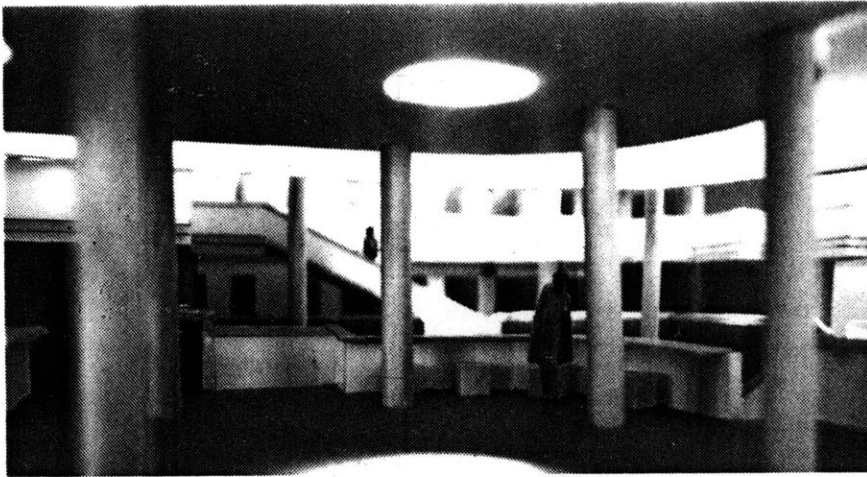
Main Space:
Reference Area, Bookstacks, Circulation

North, Northeast, Northwest Light

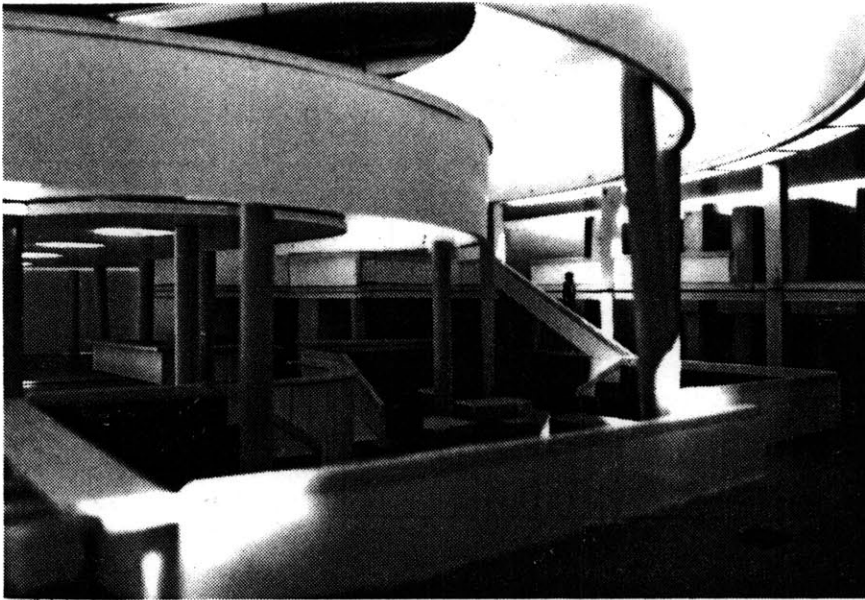


Section

40.

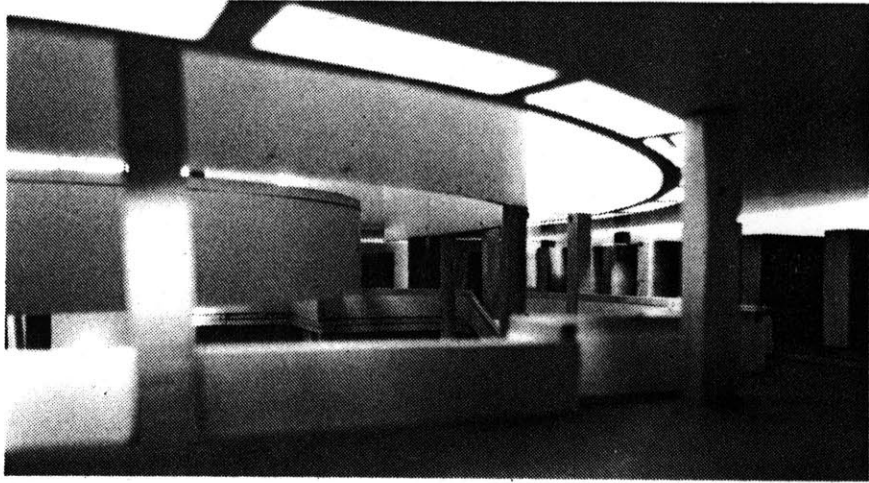


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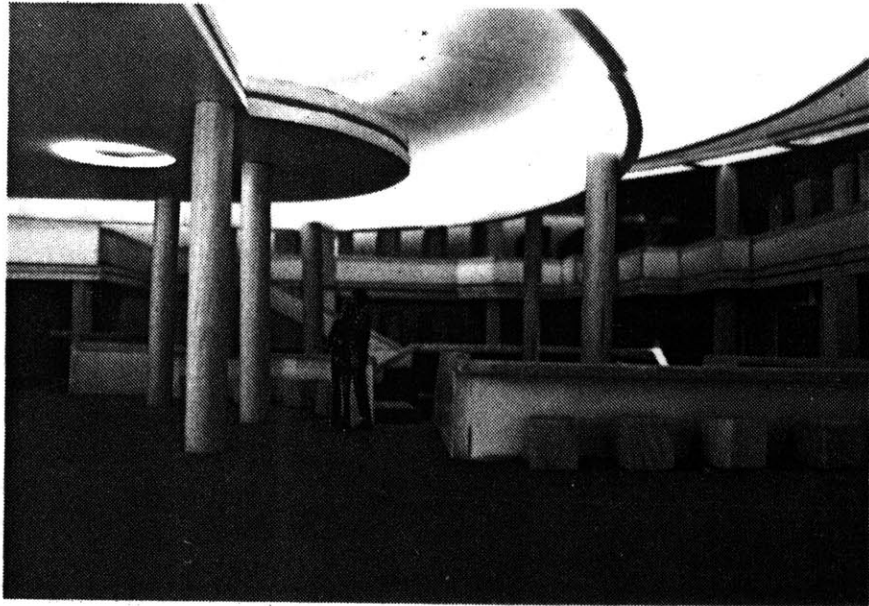


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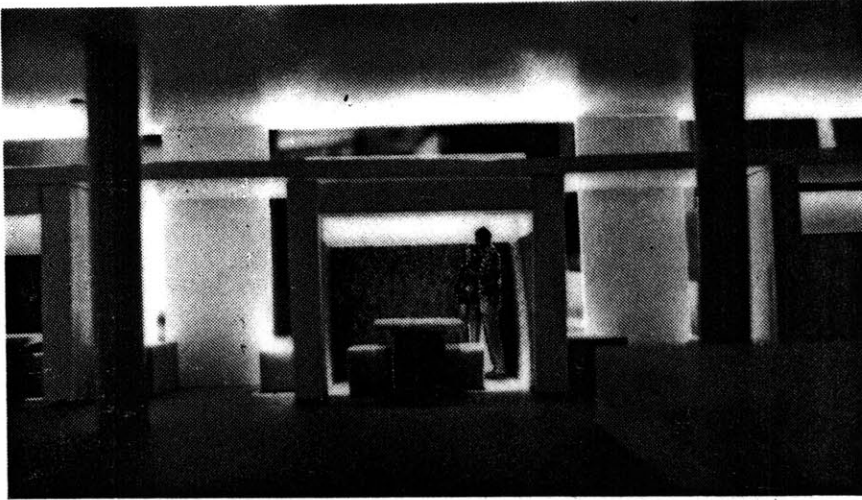
1. *View of Reference Area.
Circulation zones receive
sunlight*
2. *Detail of skylights.*
3. *View from Children's wing.*
4. *View into Reference Area
from Entry*
5. *View across Reference Area
toward Entry.*
6. *View from second floor.*
7. *View into Reference Area.*



6.



7.



Elevation View

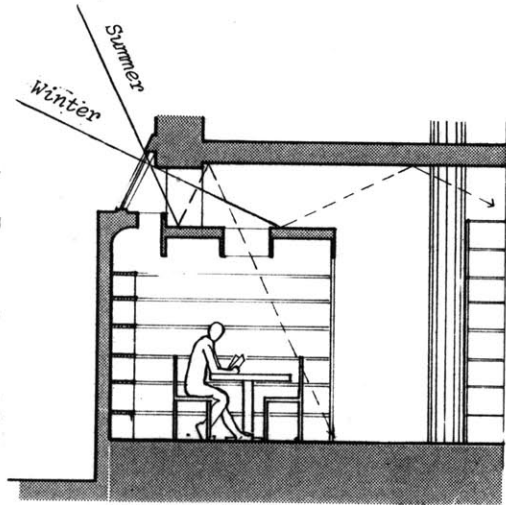


Elevation View

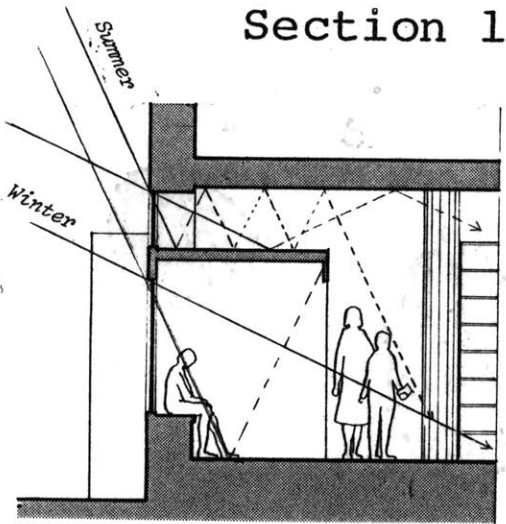


Perspective View

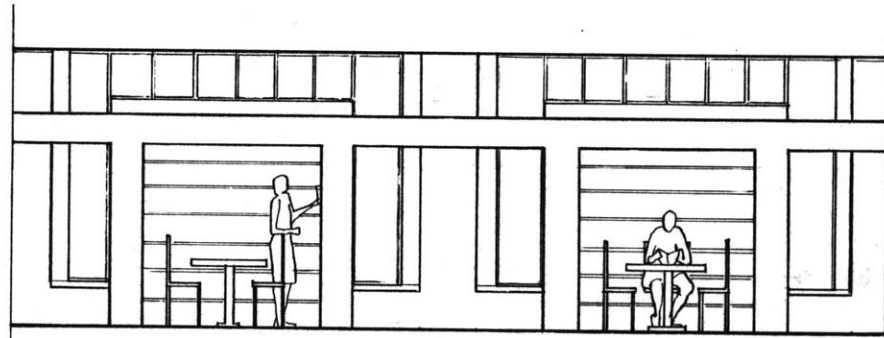
Inhabited Edge: Reading Alcoves



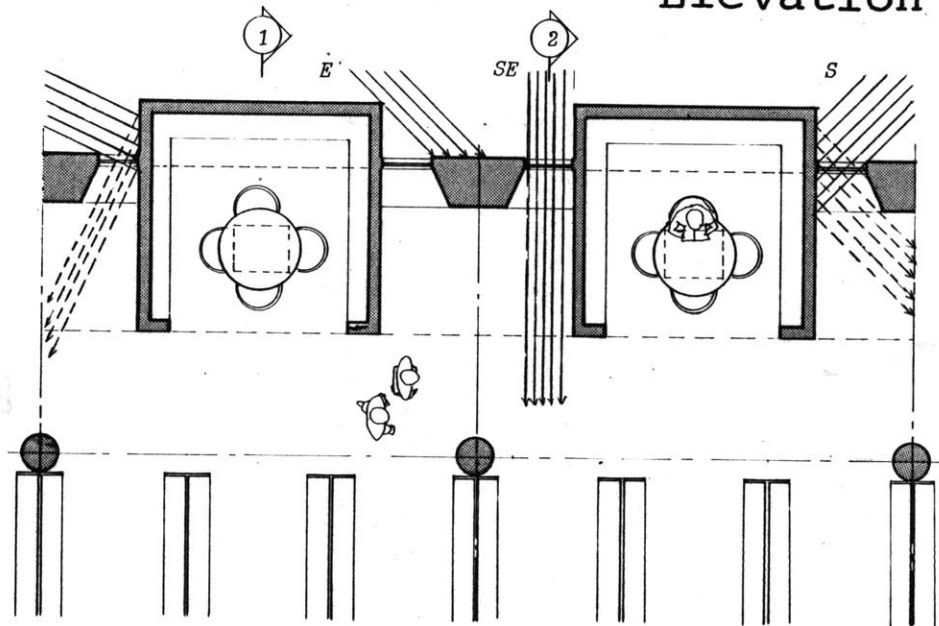
Section 1



Section 2

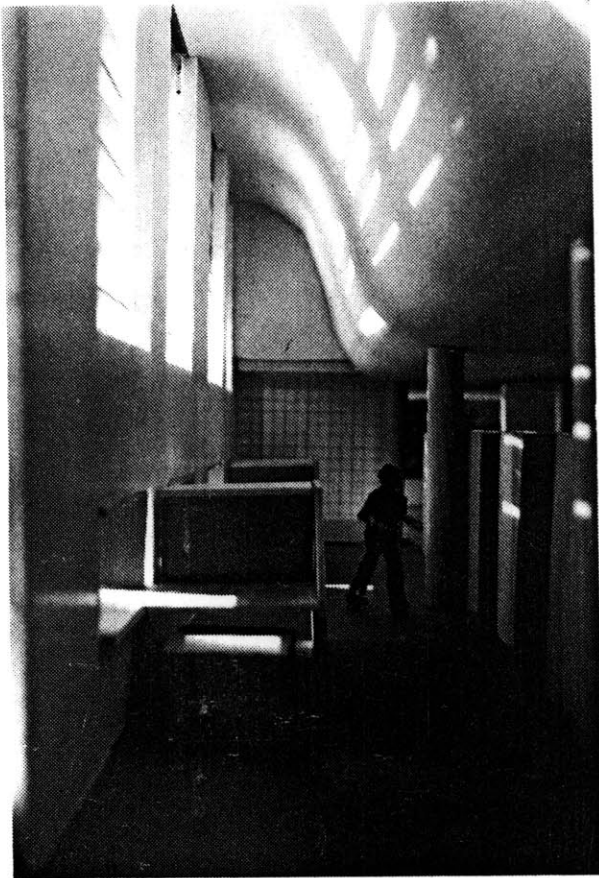


Elevation



Plan

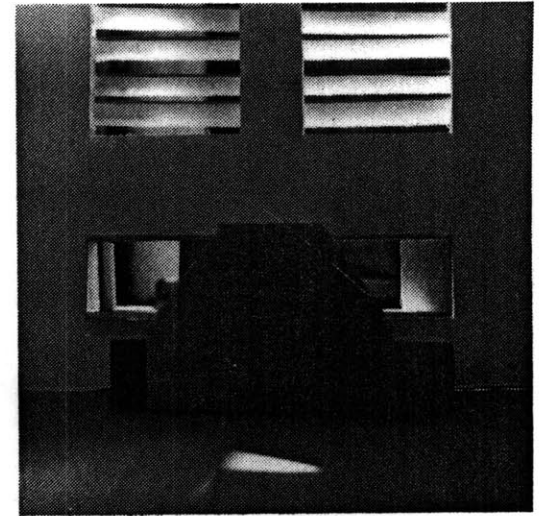




*Carrels. Winter sun.
Shutters open*

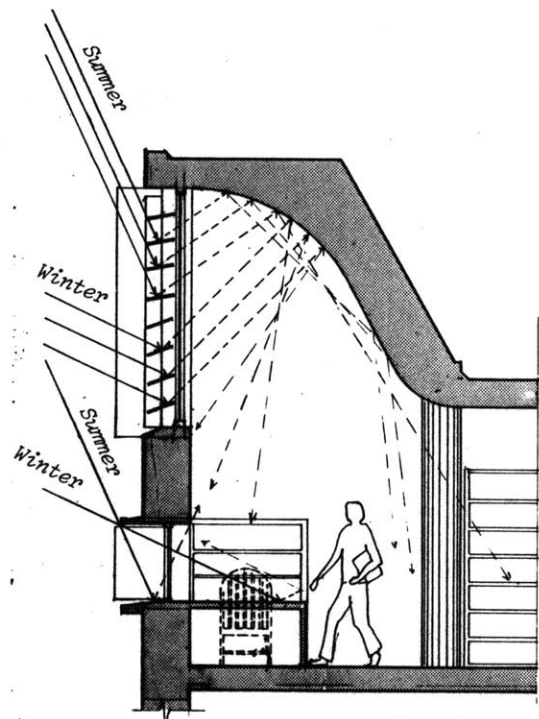


*Carrels. Summer sun.
Shutters open*

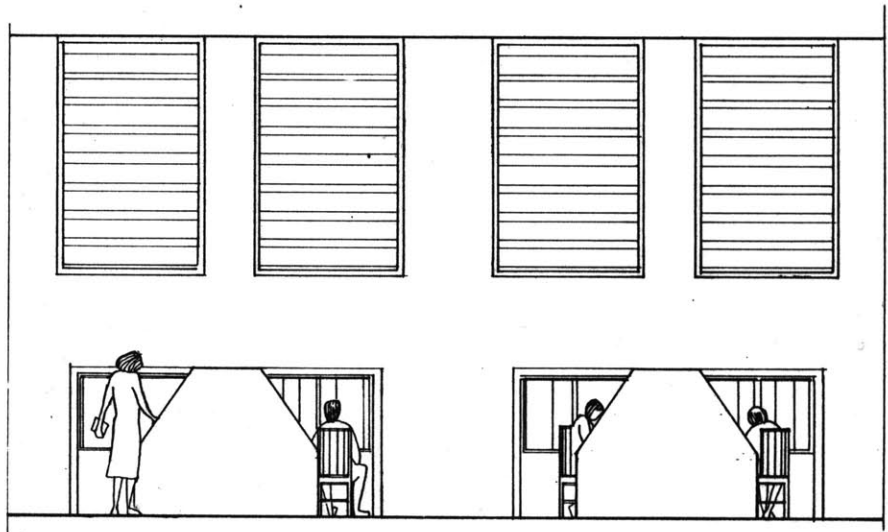


Elevation of carrel.

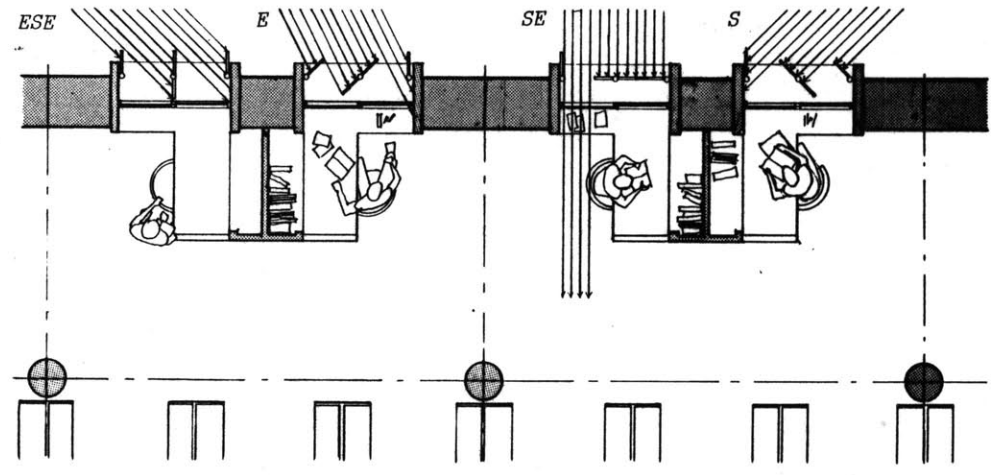
Inhabited Edge: Carrels



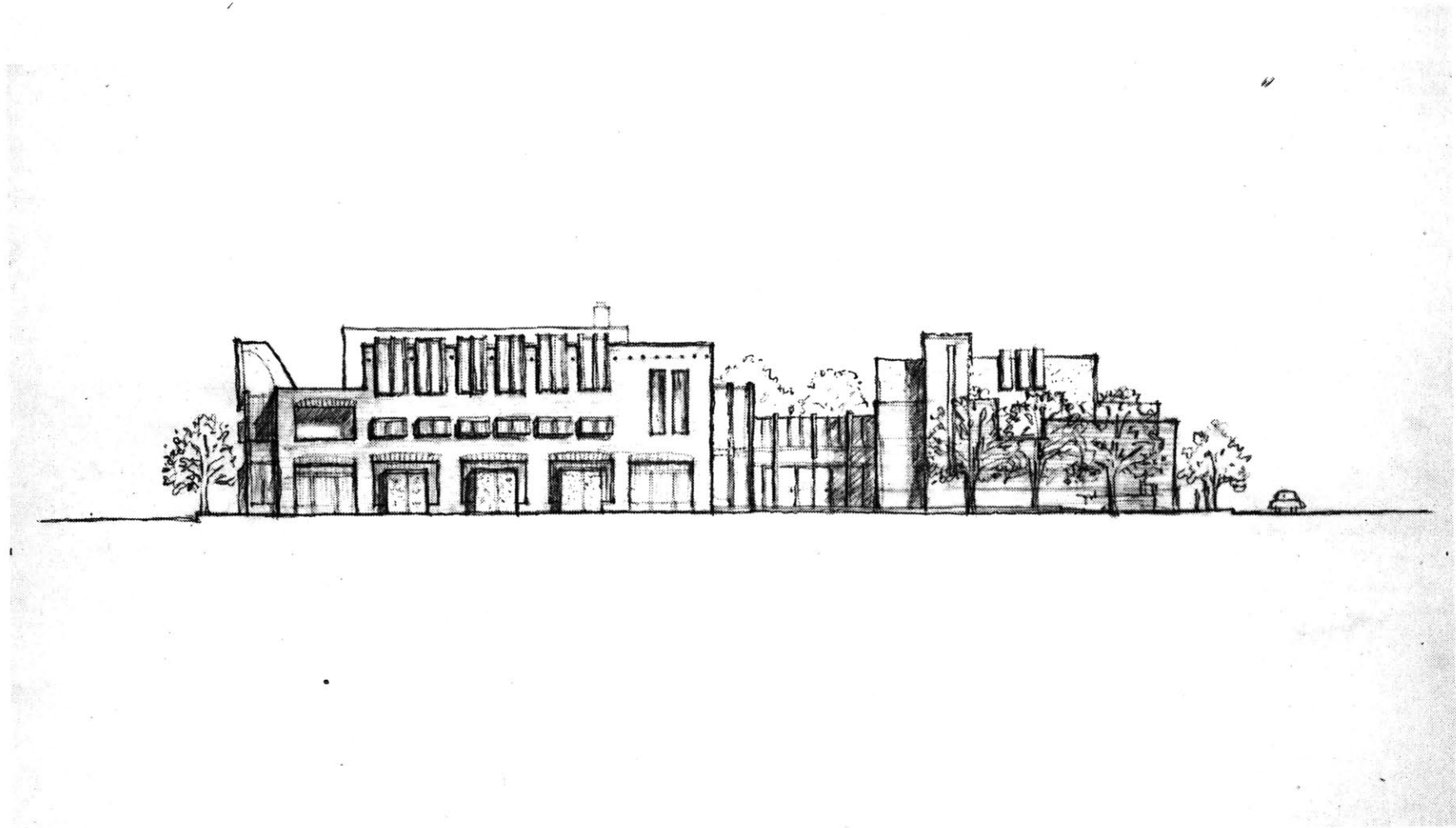
Section



Elevation

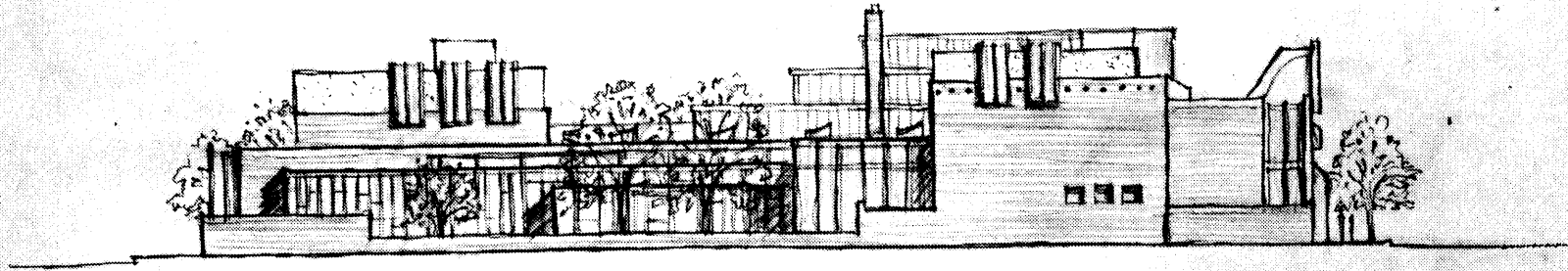


Plan



Street Elevation

Enclosure Studies

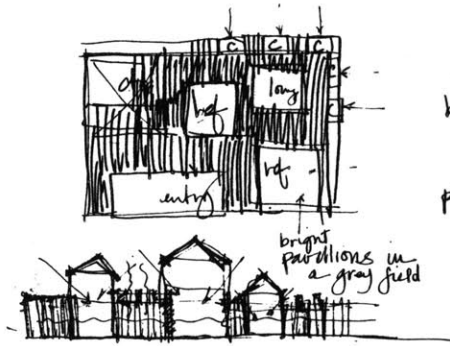


Garden Elevation

56.

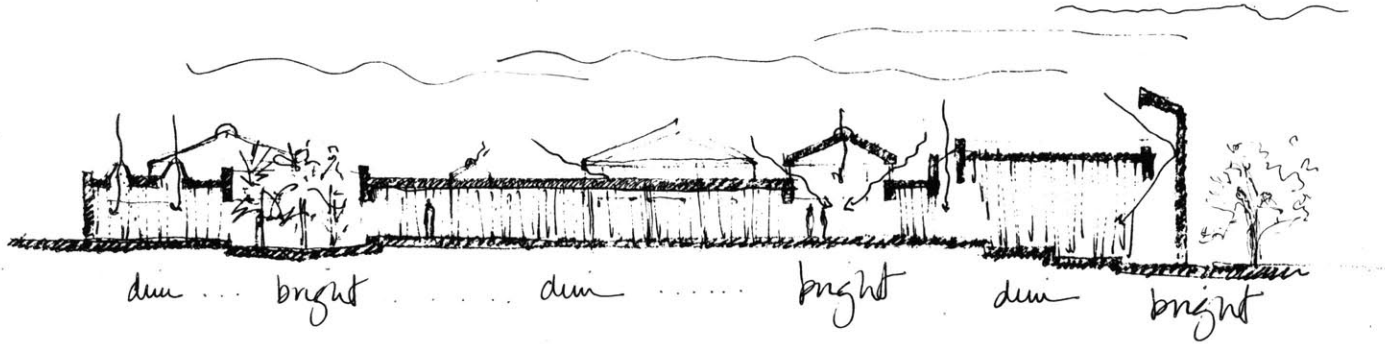
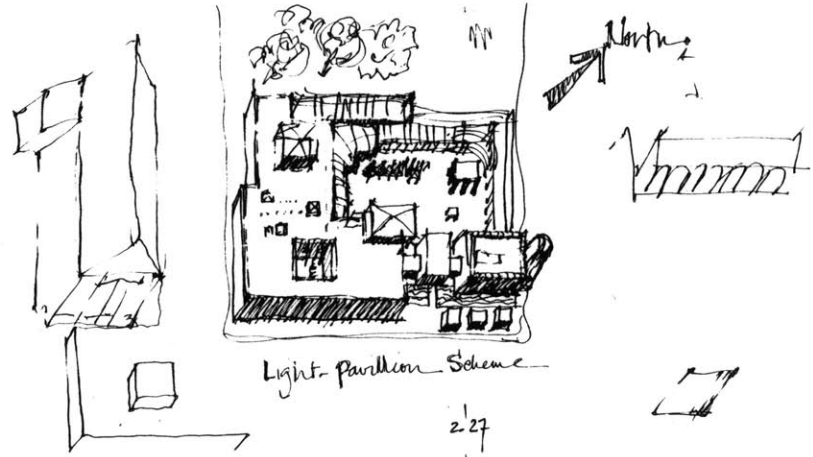
Design Process and Evaluation

This chapter presents the development of the library design through sketches, notes, and photographs of early lighting models. The first part includes several early lighting and organizational concepts. The second part is a documentation of the first scheme which was partially explored in models. Sketch-plans and sections show the lighting and architectural scheme. Photographs of the models are accompanied by evaluation comments which are based on the "light program" criteria. Redesign sketches follow these comments; and in some cases these sketches themselves are taken into models and again evaluated.

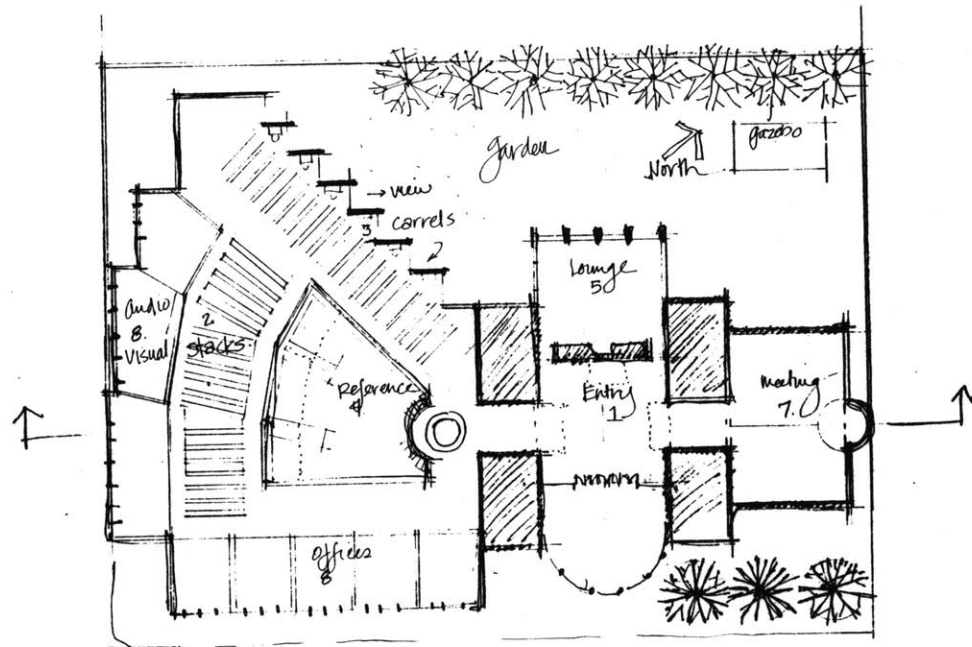


book ends →
continuous
gray tone
connecting tissue
places → bright
spots or
pavilions

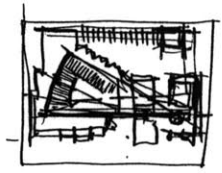
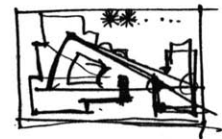
Concept: Field/Labyrinth
Non-directional
2/16



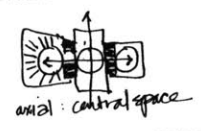
Early Organizational and Lighting Strategies



layers around core

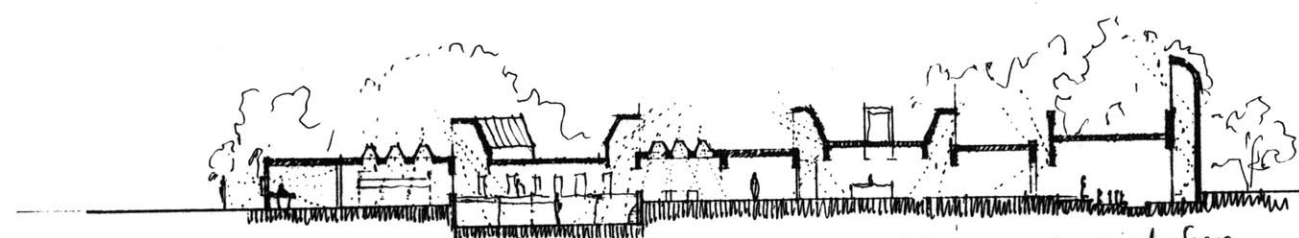


2/22



Light Axis: directional

2/11

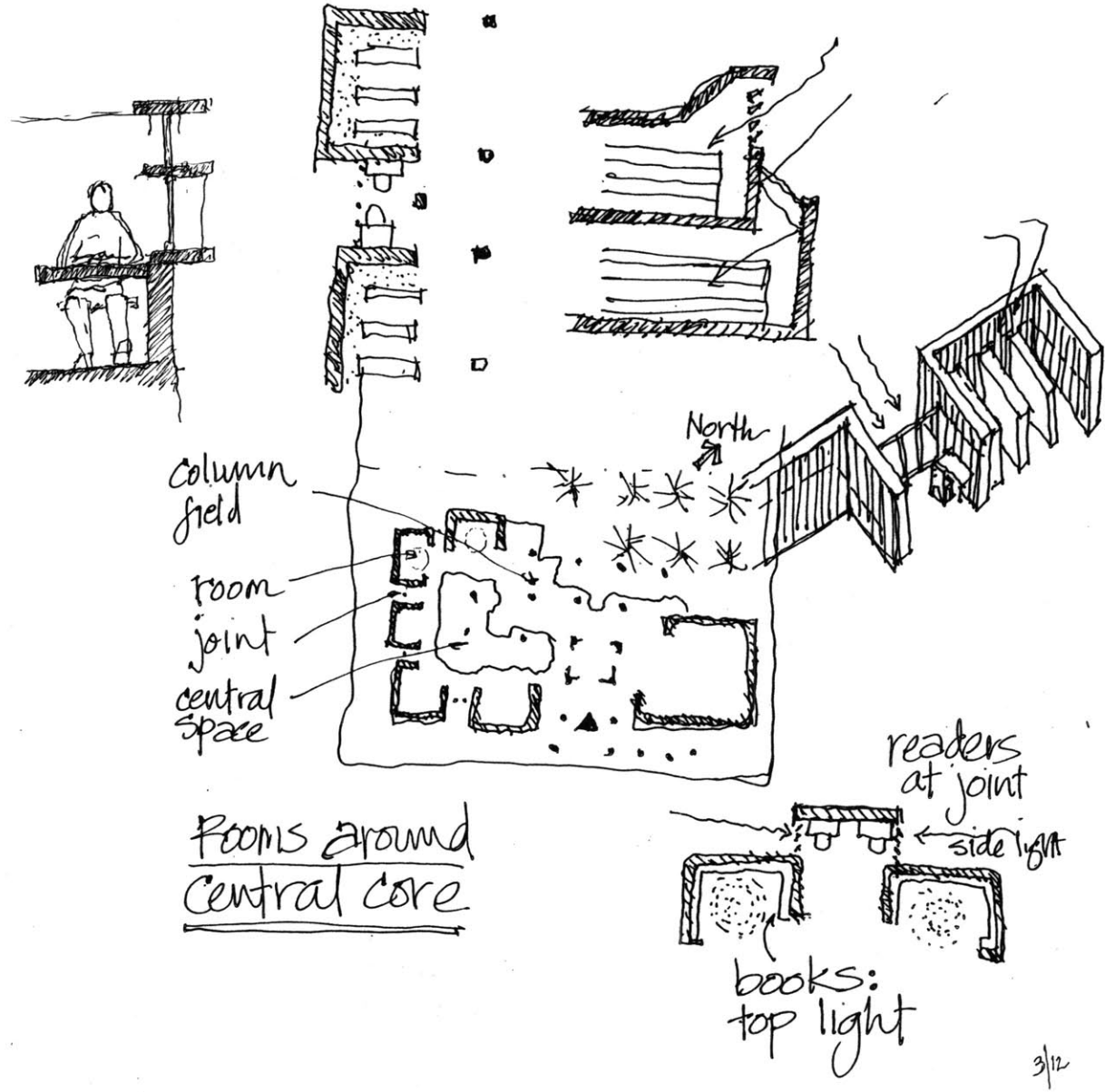


side light direction top light diffuse edge light enclosing top light diffuse edge light enclosing edge light focus

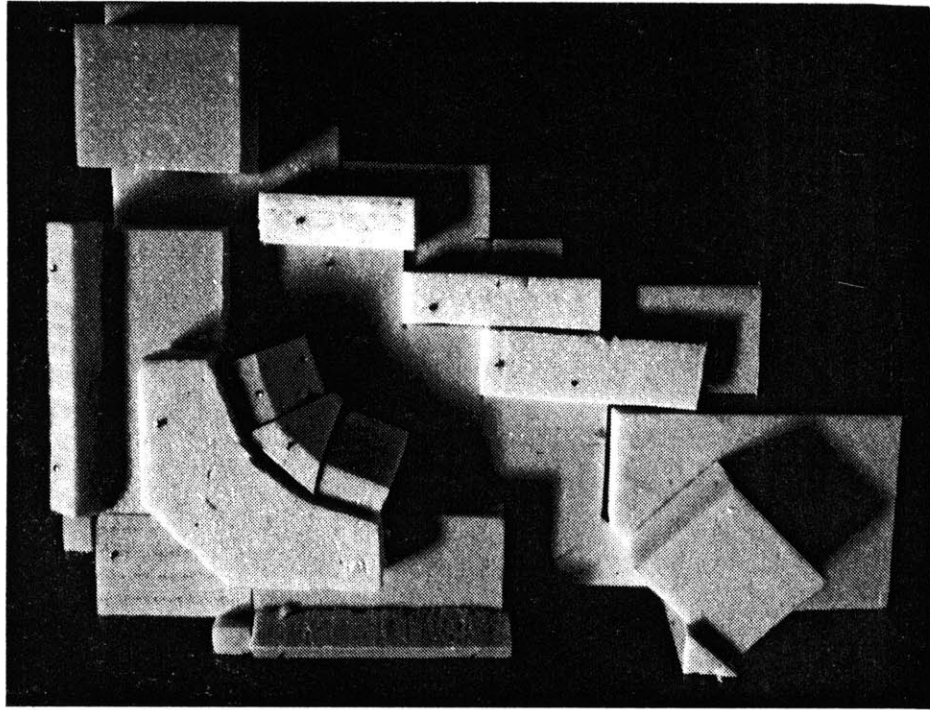
Light Axis

Prin-
Mebur
Permaton
11-11-11

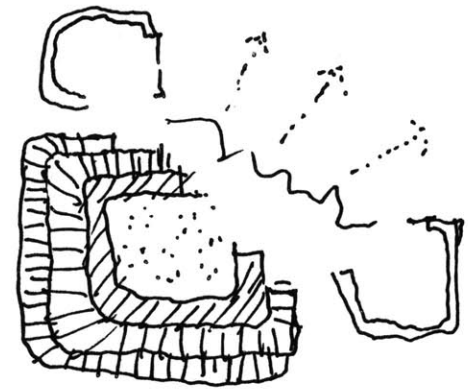
Feb 2011



62.



Massing Model

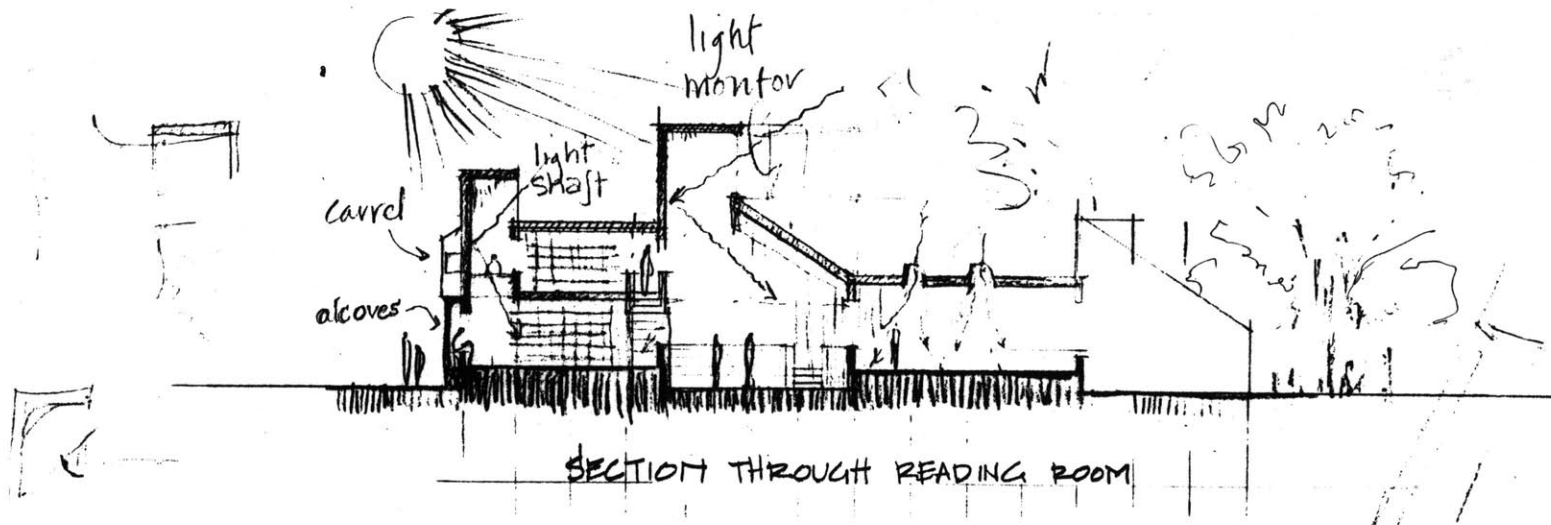
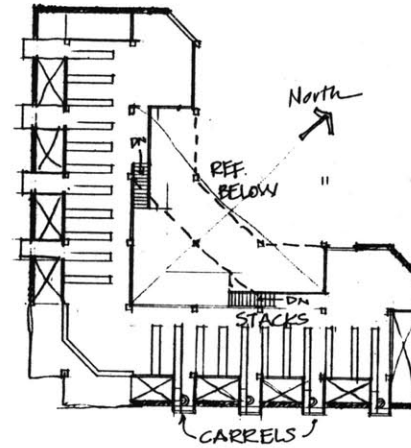
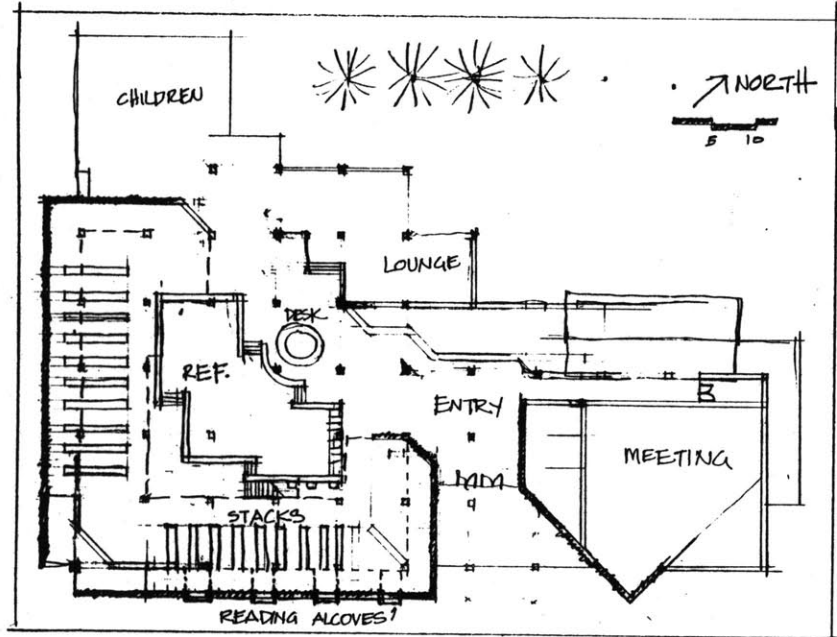


Light Layers

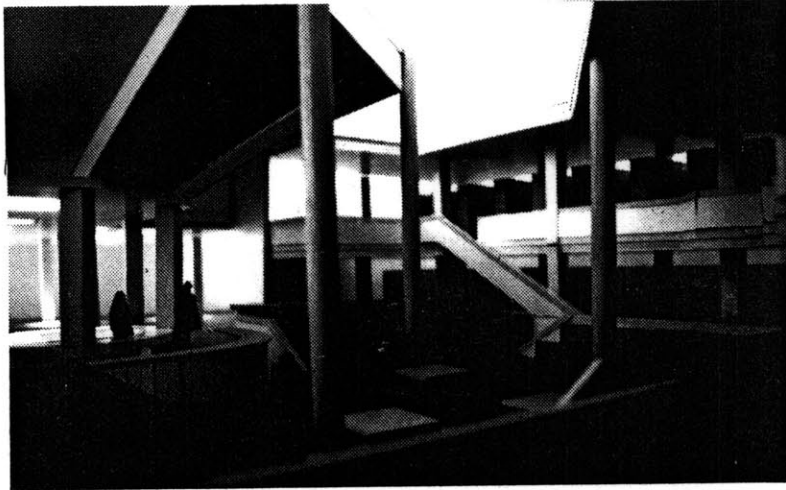
First Modelled Scheme

SKETCH-PLANS AND SECTION

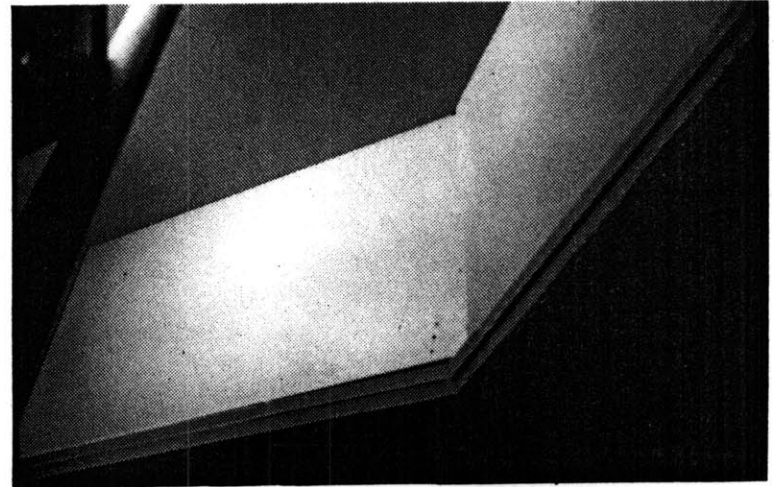
63.



64. LIGHT MODELS



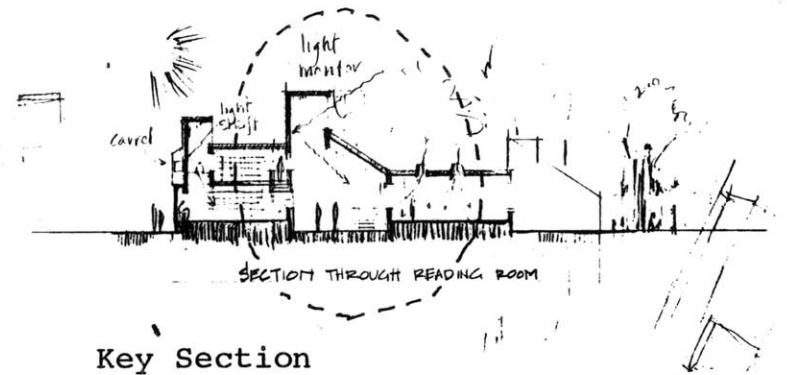
Reference and Bookstacks



Detail of Skylight



View into Reference from Entry



Key Section

EVALUATION

Bookstacks:

- not enough light
- brightness differential too great between central space and bookstack and outer wall and bookstacks
- sense of enclosure too strong; not enough view to outside

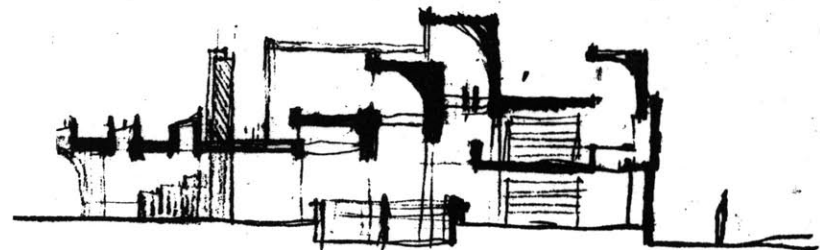
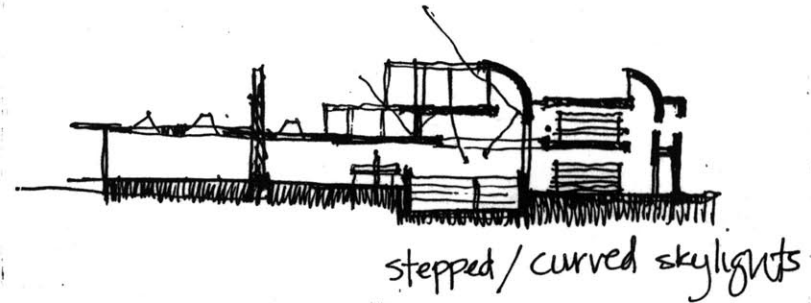
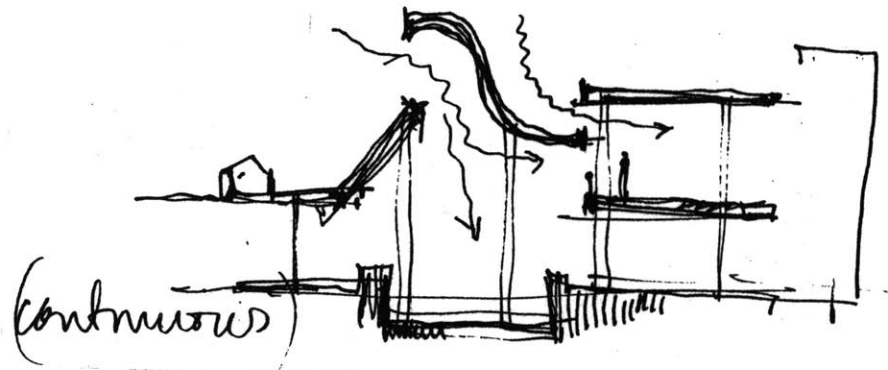
Reference Area:

- gradation of light between light source and space too abrupt
- skylight has too strong an accent in space
- light transition from Entry to Reference too abrupt; not enough continuity with entry sequence

Conclusions:

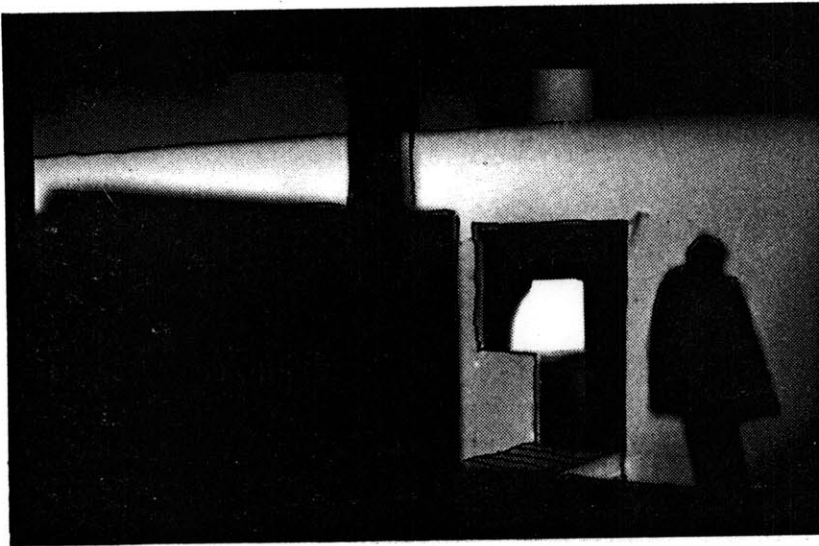
- form of central skylight is too strong and too singular: needs to be broken down
- light should be spread more evenly into adjacent spaces: increase plan dimension of skylight; soften edges where planes intersect

REDESIGN SKETCHES

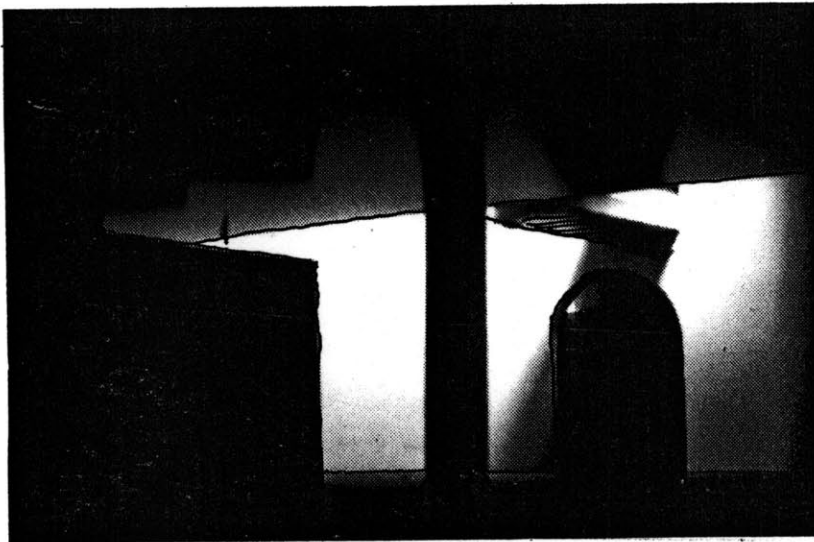


LIGHT MODELS

66.



EDGE CONDITION: CARRELS 1



EDGE CONDITION: ALCOVES 1

EVALUATION

Carrels:

- not enough control of direct sunlight coming in through view window which is only light source
- too strong a distinction between carrel and adjacent space

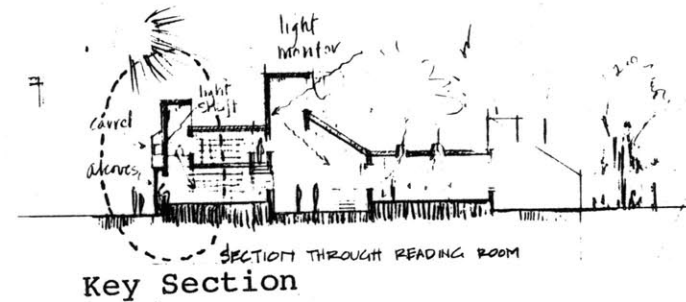
Reading Alcoves:

- not enough light in alcove
- too strong a distinction between alcoves and adjacent space

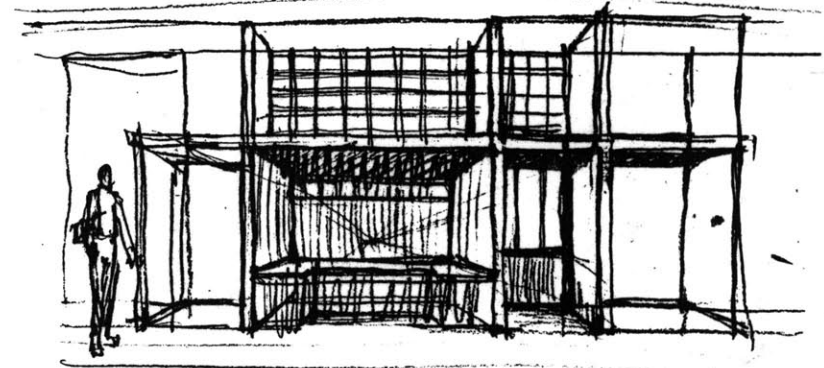
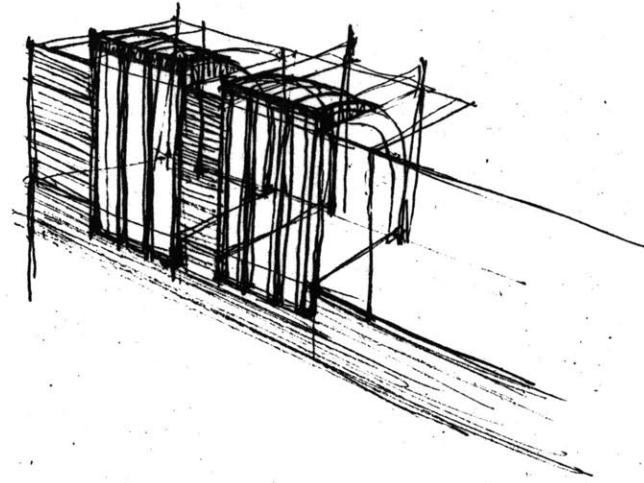
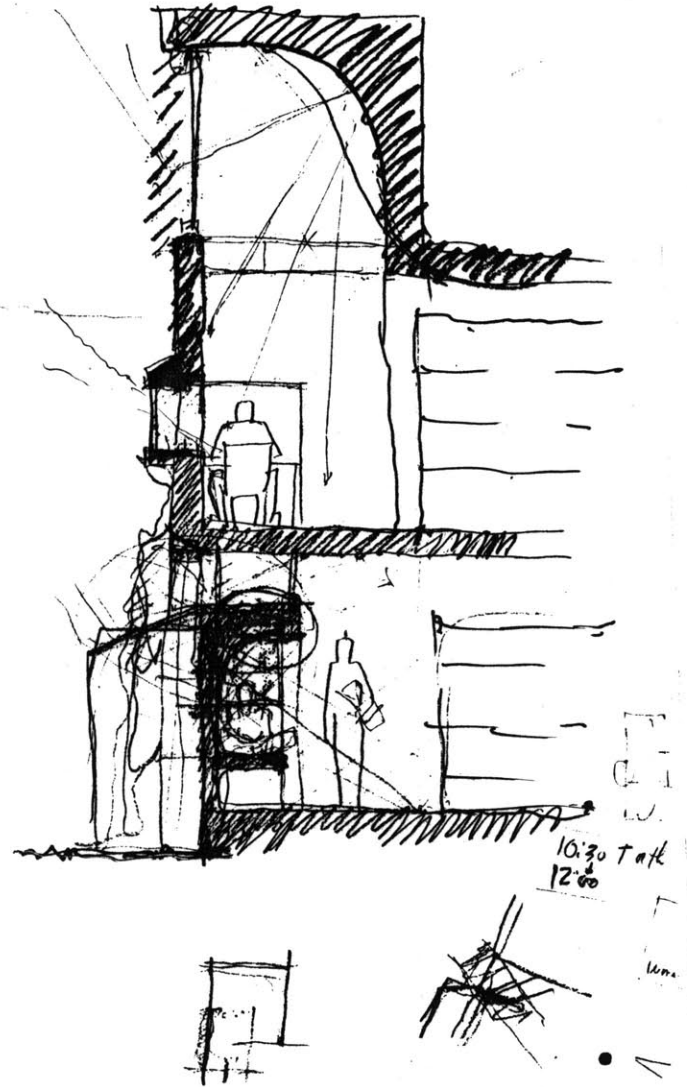
Conclusions:

- indirect lighting of inner surface of exterior wall does not succeed in reflecting light deeply into bookstacks; inappropriate focus on wall results in intensified feeling of enclosure: need more views to the outside, and more side light directly illuminating space
- light shaft does not draw enough light down to first floor: -make two different conditions on different floors.

Problem: to introduce side light with controlled sunlight and controlled views into building



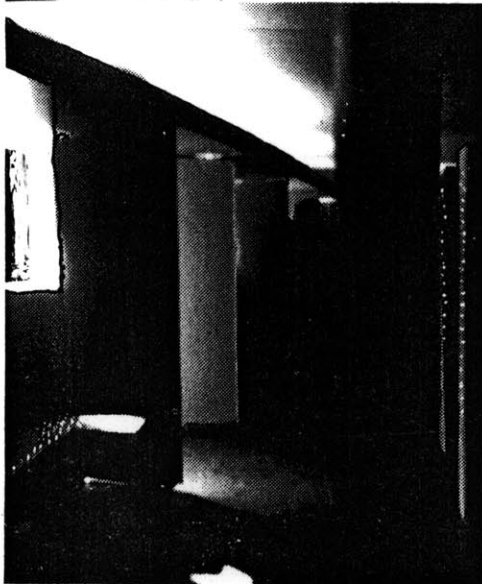
REDESIGN SKETCHES



68. LIGHT MODELS



EDGE CONDITION: CARRELS 2



EDGE CONDITION: ALCOVES 2

EVALUATION

Carrels:

- direct sunlight not properly controlled
- scoop does not reflect enough light back onto carrels
- scoop does not conduct light smoothly into bookstacks

Reading Alcoves:

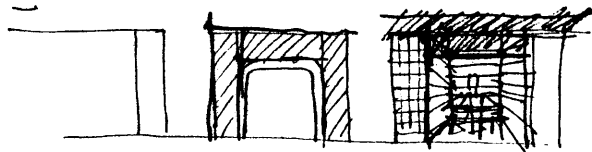
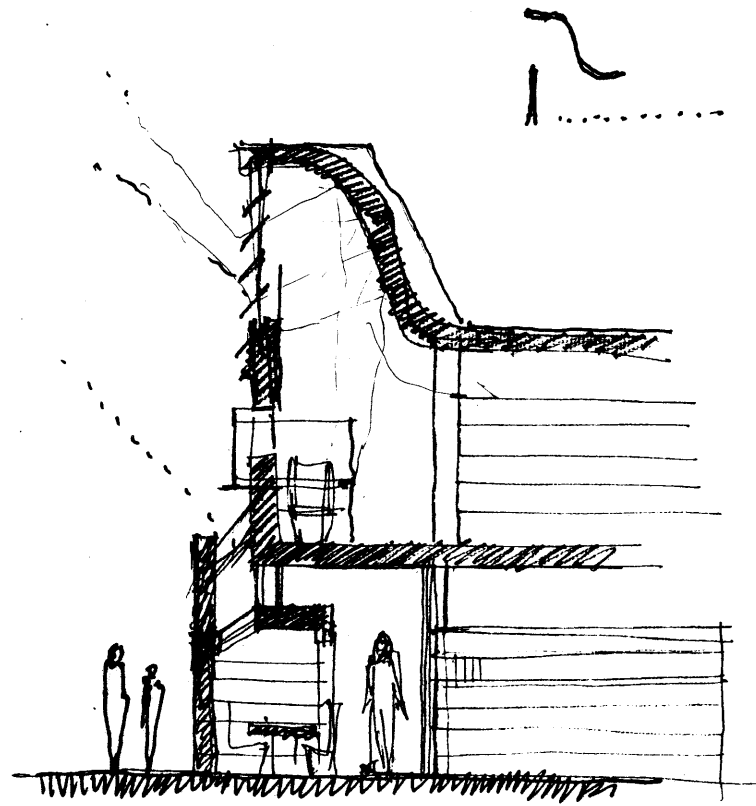
- not enough distinction between alcoves and adjacent space
- not enough light inside alcoves

Conclusions:

- windows above carrels need horizontal screens to control south sun light and to deflect light onto surface of light scoop
- vertical screens on outside help to control east light
- increase depth of alcove; and increase size of its light source

REDESIGN SKETCHES

69.



70.

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74.

Footnotes

1. Dieterle, plate 26.
2. Kalff, p. 38.
3. Brawne, p. 15.
4. Global Architecture Volume 2, p. 25.
5. Brawne, p. 12.
6. Brawne, p. 8.
7. Brawne, p. 23.
8. Brawne, p. 23.
9. Norberg-Schulz, p. 133.
10. Rasmussen, p. 196.
11. Jellico, p. 146
12. Iwamiya and Itoh, p. 56.
13. Newsom, p. 129.