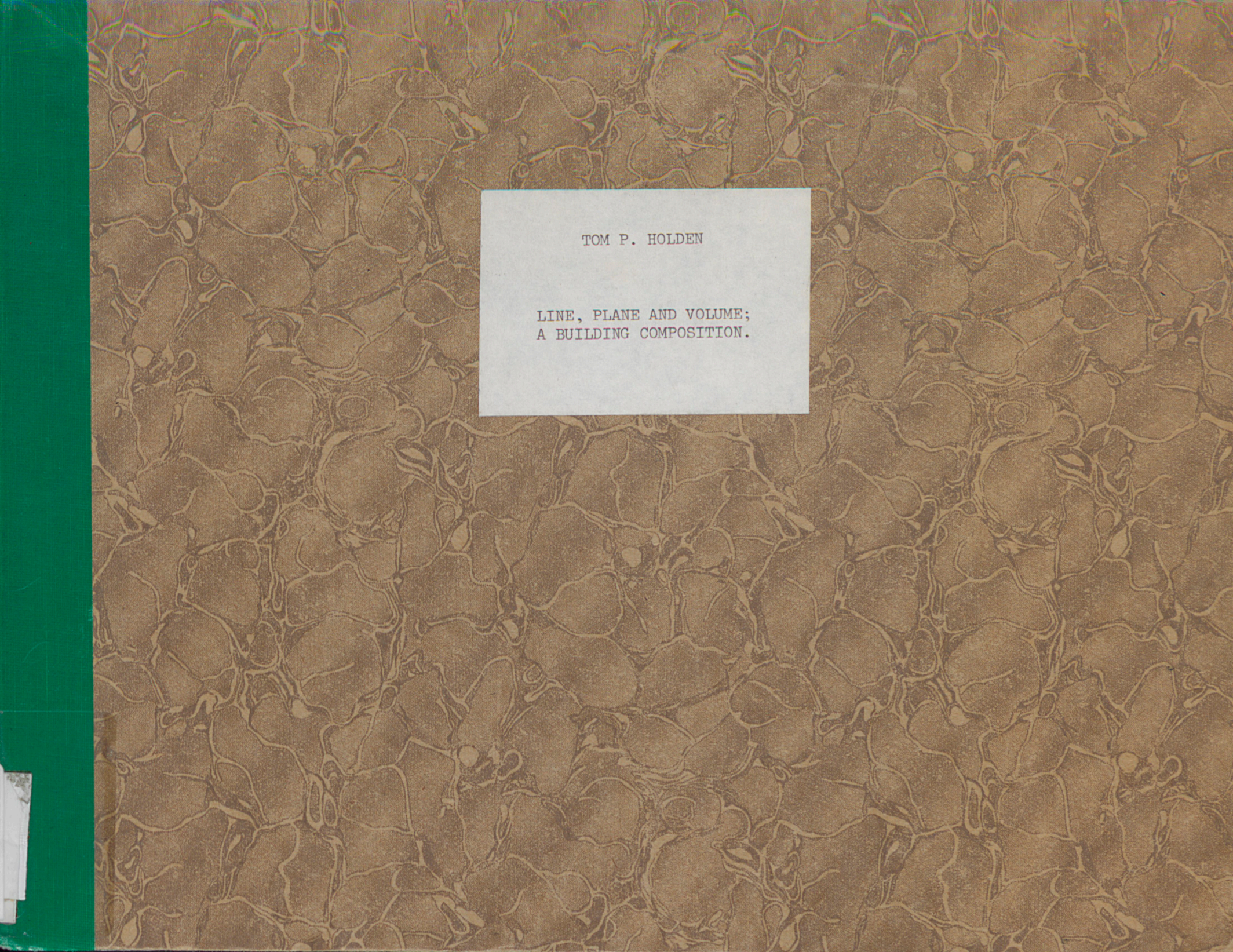


The image shows the front cover of a book. The cover is decorated with a brown marbled paper pattern, featuring swirling, organic shapes in various shades of brown and tan. A white rectangular label is pasted onto the upper center of the cover. The label contains the author's name and the title of the book in a simple, black, sans-serif font. On the far left edge of the image, a portion of a green book cover is visible, suggesting this book is part of a collection or set.

TOM P. HOLDEN

LINE, PLANE AND VOLUME;
A BUILDING COMPOSITION.

LIBRARY
MONTANA STATE UNIVERSITY
BOZEMAN

LINE , PLANE, AND VOLUME

THESIS 1978

T.P. HOLDEN

LINE, PLANE, AND VOLUME
A BUILDING COMPOSITION
UNDERGRADUATE THESIS IN ARCHITECTURE

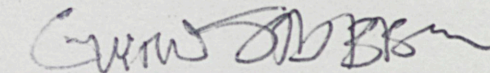
by
T. P. Holden

Submitted to the School of Architecture
as partial fulfillment of the requirements
for the Degree of Bachelor of Architecture

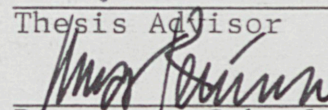
at
Montana State University
Bozeman, Montana

June 9, 1978

APPROVED BY:



Thesis Advisor



Director, School of Architecture

P378
H6996

~~1192570~~
729.6
M76
H711

ACKNOWLEDGMENT

To my parents, Mr. and Mrs. Harold Holden,
I wish to dedicate this thesis for their continued
guidance and encouragement throughout my academic
education.

The writer also wishes to express his grateful
appreciation to Professor Guyton Stubbs for his
time and assistance in the development of this
thesis.

STATEMENT OF PERMISSION TO COPY

In presenting this thesis in partial fulfillment of the requirements for an advanced degree at Montana State University, I agree that the Library shall make it freely available for inspection. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by my major professor, or, in his absence, by the Director of Libraries. It is understood that any copying or publication of this thesis for financial gain shall not be allowed without my written permission.

Signature Tom P Holden

Date 6/9/78

PREFACE

This thesis is the result of the re-examination of my attitudes in an attempt to come to grips with where I currently stand in my progress of obtaining an academic architectural education.

This re-examination came about after having spent a quarter as a teacher's assistant, in a first quarter freshman design class. This beginning class represented for the incoming student an exposure to an overview of the factors which influence the built form of the environment.

A series of exercises were conducted throughout the quarter using the basic design-language elements of Point, Line, Plane and Volume. It was out of this quarter of being constantly called upon to explain and expand upon these basic design relationships that my thesis began to develop. Possibly the greatest thing that occurred to me was, I had forgotten or failed to apply the many freshman design principles which I had learned. By taking a few steps backward,

back to these basic design elements of architecture and visual perception, I began my search of where I truly stand in my academic education.

This book will be a documentation of the major avenues of research and works I have gone through in both quarters of this undergraduate thesis.

TABLE OF CONTENTS

<u>Subject</u>	<u>Page</u>
Acknowledgment.....	i
Statement of Permission to Copy.....	ii
Preface.....	iii
 Thesis Statement.....	 1
Introduction.....	2
Conceptual Foundations.....	5
The Elements.....	7
The Qualities.....	8
Pieces and Parts.....	18
When, Where, Why and How.....	29
Creating Volume.....	32
The Program.....	40
The Site.....	45
A Building Composition.....	48
Conclusion.....	50
Illustrations.....	52

THESIS STATEMENT

The intrinsic human nature of visual perception of the built environment lies within the basic design-language of Line, Plane, and Volume.

INTRODUCTION

My interest in this area of research stems from the belief that "good" architecture has its roots in the very understanding of the basic design elements, and how they are used and visually perceived.

This perceptual goodness seems largely haphazard rather than intentional. Few attempts have been made toward developing a theoretical framework based upon the visual impact of the built environment. It is this search for a framework of design that has given me the impetus to re-examine and re-develop a program of design relationships.

Line, Plane and Volume are unmistakably the building blocks of architecture. Not only do these elements control and define the area of function, but they also create an aesthetic happening. Unless there is an honest understanding of Line, Plane and Volume, there will be a failure, either in part or in total, of this aesthetic harmony.

Harmony results when there is a pleasing arrangement of well proportioned elements, and when there is such accord between the various parts that the effect of unity is produced. This unity obtains its qualities in perceptual happenings like, symmetry/asymmetry, solid/void, order/disorder/ vertical/horizontal, and many other visual associations. The basis of my thesis is the exploration of twenty of these visual qualities, and researching their importance in determining "good" architecture.

Line, Plane, and Volume are single elements that almost everyone can begin to describe and relate to. However, the interrelation of these elements becomes a much more complex set of qualities.

This thesis will not dwell upon individual word associations or qualities, for each association itself could easily take a great amount of time to develop. This is not to say that only the basics are studied and developed here, but that exploration of the vast overlapping qualities may be brought

together to become an integral part of any thoughtful design. "This refinement is characterized by the freedom from ostentation and by restraint in design."¹

This "refinement" becomes the parting point within this book. The first part of the book deals primarily with the idea of the individual qualities. The second deals with the pulling together of these qualities into a composite of built form.

CONCEPTUAL FOUNDATIONS

This is a description of the conceptual idea implemented throughout this thesis:

The elements Line, Plane, and Volume are necessities in creating architecture, but it is the qualities of form, that control and create "good" architecture.

Architecture as we know it combines two not easily reconciled tasks. On the one hand, it has to provide a shelter that provides its inhabitants against unwelcomed outside forces, and offers them a congenial internal environment. On the other hand, it must create an interior physically adapted to its functions and visually expressive, inviting, deterring, informative, etc.

This thesis will be throwing these two tasks out of balance and deal primarily with the visual expressiveness.

This expressiveness will be analyzed in two parts. The first will be an analysis of the pieces

and parts which create a space. The second will be the pulling together of these pieces and parts into an actual building composition, void of specific function.

THE ELEMENTS

LINE ----- is the extension of a point so that the dimension of length is perceived.

PLANE ----- is the extension of a point so that the dimensions of length and width are perceived.

VOLUME ----- is the extension of a point so that the dimensions of length, width, and depth are perceived.

The element of volume is the most complex element of the three and is, therefore, broken down into two separate groups, those of Mass and Space.

MASS ----- includes the three dimensions of length, width, and depth, but describes the effect of a solid object or "box" seen from the outside.

SPACE ----- also includes the dimensions of length, width, and depth but describes the "box" from the inside. Literally the air enclosed by the planes of the top, bottom and sides.

THE QUALITIES

The next step was to attempt to understand what gives architecture its character and creates the visual image we experience everyday.

A list of twenty vocabulary terms are chosen and given the title of "Qualities of Architecture". It is using the idea, that the degree of understanding of these, plus many other qualities, is responsible for either the success or failure of an architectural happening.

These qualities which result from the manipulation of the primary elements, Line, Plane, and Volume, are of utmost importance in determining the general character and quality of the architectural environment.

Twenty important qualities have been selected, and given brief "descriptions" as to their context in developing the framework of this thesis, a search for "good" architecture.

THE QUALITIES (THE TERMS)

Symmetry/Asymmetry

Proportion/Scale

Rhythm

Order/Disorder

Intersection

Interlocking

Interpenetration

Static/Dynamic

Link

Layering

Opacity/Transparency

Limits

Space (Empty/Forlorn)

Vertical/Horizontal

Solid/Void

Depth

Mobility

Texture

Inside/Outside

The preceding list of word associations or terms now called qualities are commonly used in describing the way people rate or judge how they visually perceived the environment.

THE QUALITIES

SYMMETRY/ASYMMETRY -- Symmetry and Asymmetry are two of the most important qualities. "Symmetry is recognized as a correspondence in size, shape, and relative position of parts that are on opposite sides of a dividing line or median plane, or that are distributed about a center or axis."² It is generally considered to be an arrangement of external form marked by bilateral conformity or geometrical regularity.

Asymmetry, in turn, is recognized as the lack of correspondence in size, shape, relative position and even proportion of the parts of a whole.

Symmetry and Asymmetry can also be discussed in terms of balance. Balance is concerned with the relation of parts to the whole. It is the balance of parts between themselves and the whole.

Balance, or the lack of it, is one of the qualities one notices most, consciously or unconsciously.

When one is viewing the environment it is not too much to say when balance is lacking.

PROPORTION/SCALE -- Proportion is the ratio or relative size of two or more dimensions. It involves a comparative relationship between parts or between the parts and the whole.

Scale is another form of porportion, it is expressed as the relationship of the apparent size of a building, space, or object to the size of a human being. Scale is the size of man as he relates to his environment. (Note: It is an important architectural principle that a building must establish its own scale without outside aids.)

RHYTHM -- Rhythm is a device that helps avoid monotony. Rhythm usually deals with some regularly repeated pattern and is a relationship of parts to parts and parts to the whole.

ORDER/DISORDER -- Order is a harmonious arrangement

which serves to organize the parts in the whole and thereby avoid redundancy, conflict, self-contradiction, and all those deficiencies that would prevent the work from being truly itself and fulfilling its various psychological and physical functions.

Disorder is not simply the maximum absence of order, it is something else. It is brought about by discord between partial orders, by the lack of orderly relations between them. The elements in a disorderly situation are purely accidental, they could equally well be some other way.

An orderly arrangement is governed by an overall principle, a disorderly one is not.

INTERSECTION -- Intersection is the meeting or crossing of two or more elements (line and plane) or ideas, to form visual points or lines of intersection.

INTERLOCKING -- Interlocking is the ability of elements to engage or interrelate with one another.

LAYERING -- Layering is the addition of elements to create a whole. It may be the layering of elements so as to create a layering of space perception. Layering has a close association with depth, from the frontal plane any change in depth may also be a change in layer.

OPACITY/TRANSPARENCY -- Opacity is the state of a body that renders it impervious to the rays of light.

Transparency is the property of transmitting light without appreciable scattering, so that elements lying beyond are visible.

LIMITS -- Limits are the existence of boundaries, or checks to expansion, or exclusions which either are not passed over or cannot or may not be.

SPACE (EMPTY/FORLORN) -- Perceptual emptiness can be described as a quality of an area whose spatial characteristics are not controlled by the

surrounding objects. Extreme emptiness is experienced where there are no objects at all. A lack of definition, as to an environment which does not refer, call, need, or respond to man, it destroys any internal sense of identity, thus the person feels totally abandoned, forlorn.

Emptiness is not always related to the absence of matter. A space on which nothing is built can be pervaded by perceptual forces and filled with density.

VERTICAL/HORIZONTAL -- Man experiences space as asymmetrical, this is due to his sensory limitations.

Vertical is the only direction distinguished by the pull of gravity. Vertical, therefore, becomes the frame of reference for all other directions. Any other spatial orientation is perceived according to its relation to the vertical.

Horizontal is the one plane on which man can move freely in any direction without the sensation of climbing or descending. Therefore, no direction

along the ground is spatially perceived. The simplest model of man's existential space is a horizontal plane pierced by the vertical axis.

SOLID/VOID -- Solid and void is a proportional relationship that is between the total solid surface and the total area of openings, voids.

DEPTH -- The dimension of depth is the release of the frontal plane into the realm of coming or going (progression-regression). This visual movement can be read in two directions, either as a departure toward the horizontal or as an arrival from it.

MOBILITY -- Mobility is the ability to serve adequately in all situations and with distinctive appropriateness in none. Mobility is when there is an impression of generating its own action and responds to elemental dynamics.

TEXTURE -- Texture is both the visual and tactile surface characteristics of something. Texture

can be the relative degree of "roughness" or "smoothness", the "hardness" or "softness" of a material.

Texture may be broken down into four sub-groups, those of character, order, size and form.

INSIDE AND OUTSIDE -- Perceptually and practically, the worlds of inside and outside are mutually exclusive. One cannot be in both at the same time, and yet they border on each other. Inside is what governs the need for space, it is a closed world of its own. The observer perceives its size or shape in relation to what he has seen before or expects to see later. But in its immediate impact, interior is essentially without relation to anything.

Outside follows different principles, it is the appearance of surface ornamentation that gives form. The outside is never alone. Surrounded by other buildings, by landscape, or by unoccupied space, outside depends on all visual dimensions - size, shape, color, spatial orientation - upon its environment.

PIECES AND PARTS

The pieces of architecture are what we commonly call walls, ceilings, floors, windows, doors, railings, etc. Walls, ceilings and floors are really just planes; windows and doors are just openings within the planes; and a railing is only a line. It is the connections or relationships between these "pieces" that allow "parts" to be formed, and the "parts" form the volume.

Before all else, the plane must be shown in its simple, sleek beauty. "Any adornment fixed on to it must be shunned as an embarrassment to its basic nature."³ Plane, whether vertical, horizontal, sloped, or pitched would again receive its due value. Its nature as a plane would remain, while a more heavily articulated surface would not register as a plane.

When two or more planes interact with each other, a variety of visual responses takes place within the perceiver. These responses take place

because of the interplay of interspace. The observer may experience this interplay of space as perceptual compression or decompression. This interspace when farther apart appears looser and thinner, while the closer interspace appears tightened and compressed. Although the observed density may be a simple function of the distance between objects, its absolute level may depend on other perceptual factors, such as the height of the planes or their shapes.

This interspace between planes also influences the degree of their mutual dependence or independence. This distance or interspace establishes a ratio or "remoteness" and "connectedness", which affects the architectural complex as a whole. The dependence or independence depends on forces of attraction and repulsion in which the planes wish to be moved apart. (See Figure 1) At a greater distance the interval may look just right, or the planes may seem to attract each other. (See Figures 2 to 4) These forces are at work whenever things are related across space.

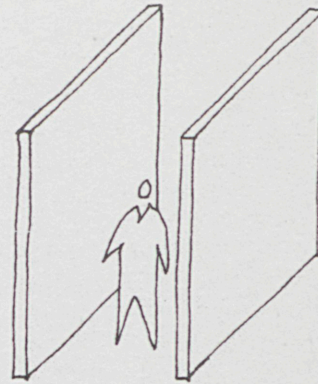


Fig. 1

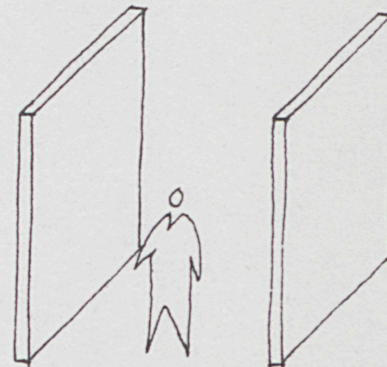


Fig. 2

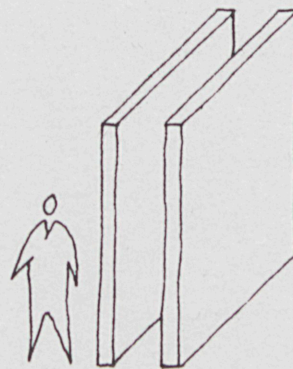


Fig. 3

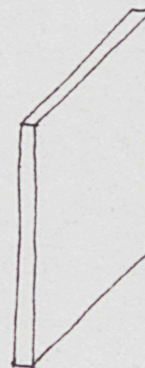
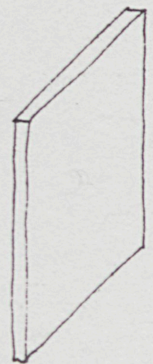


Fig. 4



"They determine the spacing of pictures on a wall, the placement of furniture in a room, the proper distance between wall planes and the proper distances between buildings."⁴

Each relationship between two planes produces a visual response. This response may be created by the planes' shapes themselves, as stated before, or the response may happen because of a more complex spatial envelope created between the planes. Each of the Figures 5 through 10 deals with these two ideas of changing shape and changing spatial envelope. But what does it take to create a spatial envelope?

A space is basically formed by the relationships between an object and a human who perceives it. "Planes establish the spatial envelope, whereby a space or a series of spaces is manifested, according to the complexity of the planning."⁵

Since man began to seek shelter, there became two types of spatial envelopes to which he related, exterior and interior space. The interaction

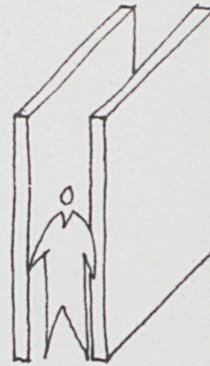


Fig. 5

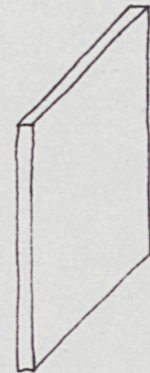
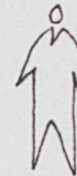
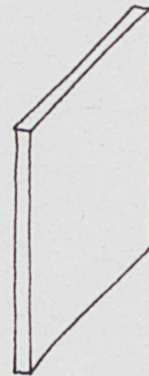


Fig. 6

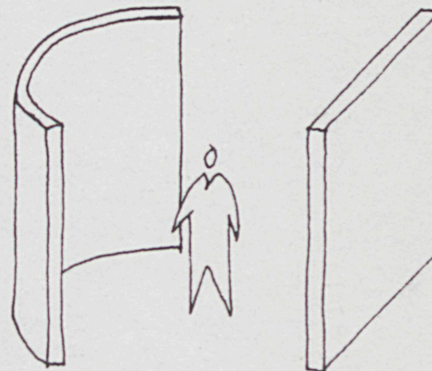


Fig. 7

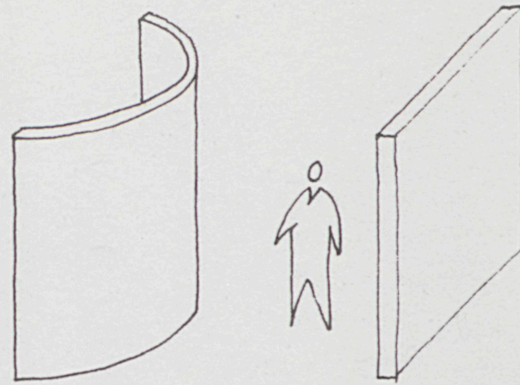


Fig. 8

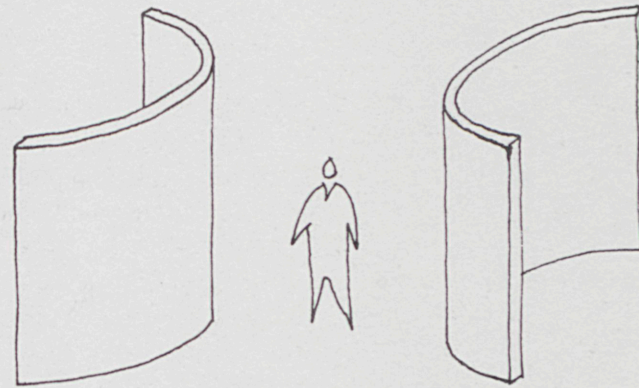


Fig. 9

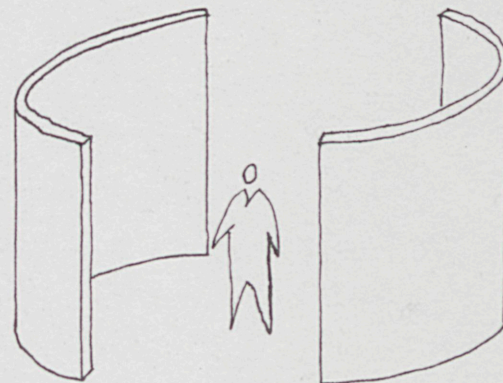


Fig. 10

between the four columns and the horizontal floor plane brings into existence a space, but this created space is not a fully enclosed space. (See Figure 11) The use of four vertical planes and a horizontal plane becomes a more enclosed space than the space between the four columns. (See Figure 12)

Interior space is delimited by three planes, two horizontal and one vertical. Exterior space, architecture without a roof, may be delimited by only two planes, a horizontal and a vertical: Our earth space, however, is pervaded by the pull of gravity, which distinguishes the vertical as the standard direction. Any other spatial orientation is perceived according to its relation to the vertical. The vertical direction defines that the horizontal plane is the only plane man can move freely in any direction, without the sensation of climbing or descending. Therefore, no direction along the

between the four columns and the horizontal floor plane brings into existence a space, but this created space is not a fully enclosed space. (See Figure 11) The use of four vertical planes and a horizontal plane becomes a more enclosed space than the space between the four columns. (See Figure 12)

Interior space is delimited by three planes, two horizontal and one vertical. Exterior space, architecture without a roof, may be delimited by only two planes, a horizontal and a vertical: Our earth space, however, is pervaded by the pull of gravity, which distinguishes the vertical as the standard direction. Any other spatial orientation is perceived according to its relation to the vertical. The vertical direction defines that the horizontal plane is the only plane man can move freely in any direction, without the sensation of climbing or descending. Therefore, no direction along the

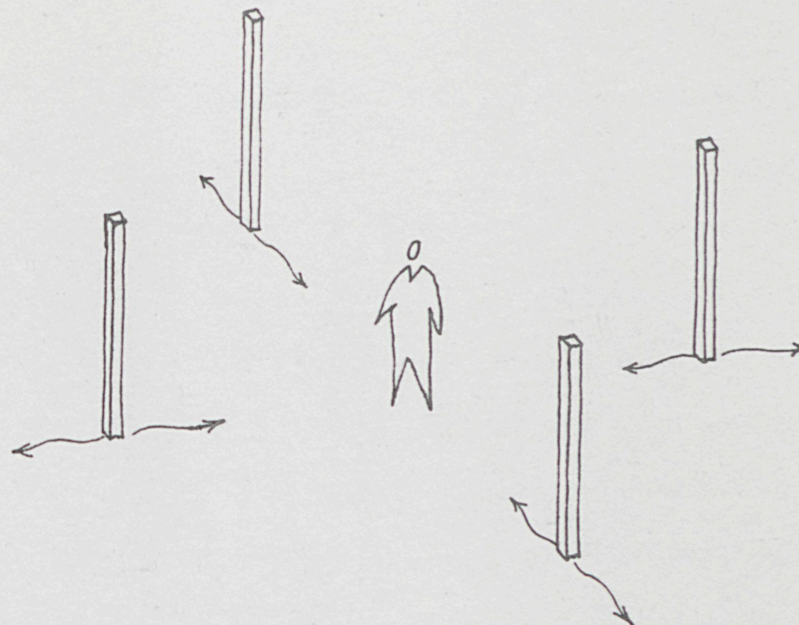


Fig. 11

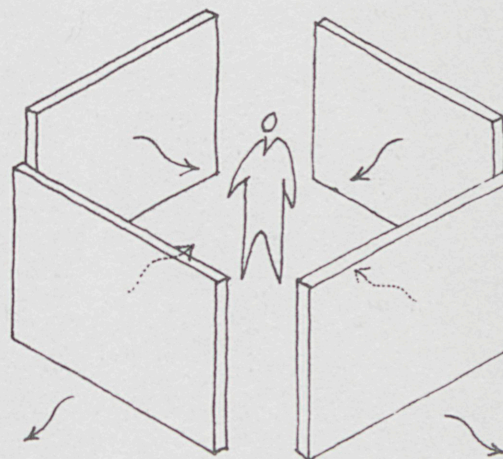


Fig. 12

horizontal is spatially distinguished. "This horizontal plane represents man's concrete world of action."⁶

Openings happening within these planes are also of great importance in the visual perception of the built environment. The opening is the physical link between inside and outside. These two distinct worlds could be separated by only an eighth of an inch or by several feet. This barrier could be easily crossed, or it might be impossible to cross, it might be translucent or opaque; whichever, their relationship to each other is quite complex.

When there is minimal visual connection between the inside observer and outside world, an opening does not acknowledge the space he is within, but is perceived as a recessed portion of the rooms boundary. (See Figures 13 & 14) If there is a distant connection between the inside and the outside, the opening appears essentially as a back drop. It is not until one is closer to the opening i.e., stronger

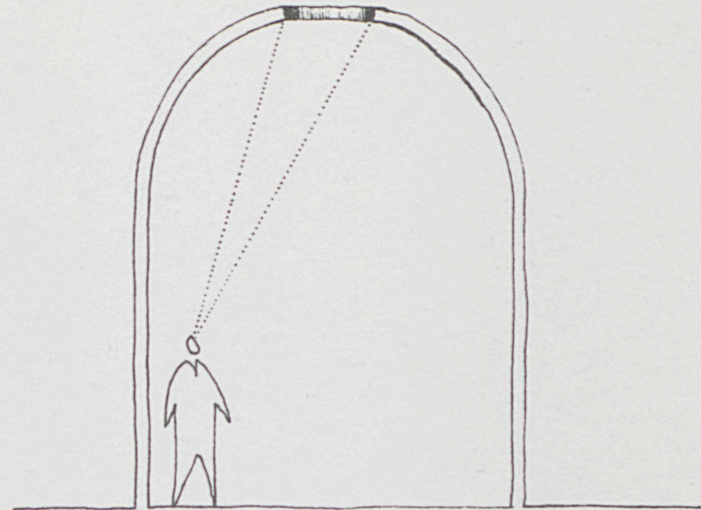


Fig. 13

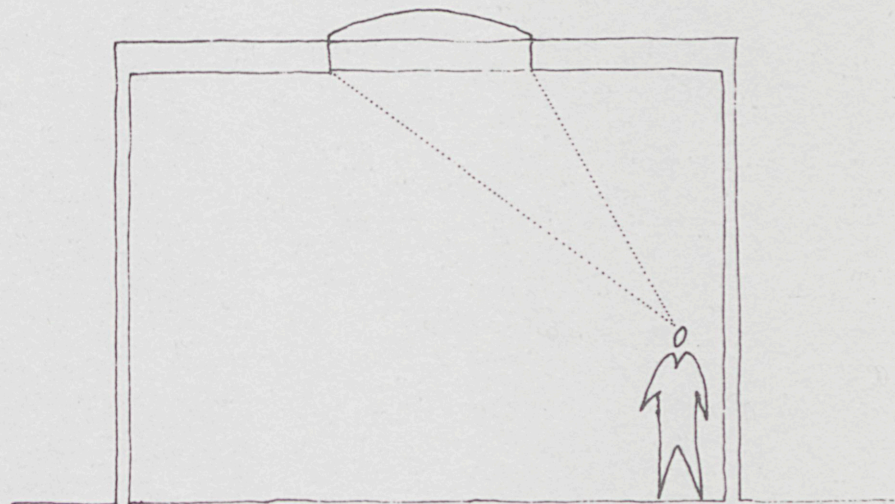


Fig. 14

connection that the interior space can visually enter the outside world. The inside and outside spaces are controlled by truths, and these are threefold. First, the primacy of space. Second, the importance of planes as creators of form. Third, the need for systematic proportion. Since the first two truths have been discussed, proportion must have its place within this section of pieces and parts.

Proportion is probably the most important aspect in controlling space. Proportion as its description states, (Proportion/Scale Qualities) is two fold, it is a ratio of two or more dimensions, and it is scale. "Proportion can be a guard against passing fashions, and a guarantee of permanent value."⁷

"Time alters fashions...But that which is founded on geometry and real science will remain unalterable."⁸

Proportion can allow a form to achieve a sense of harmony through formal relationships. Form is harmonious when its internal and external relationships are such that it creates a whole. It is the ability to make one form from twenty forms.

WHEN, WHERE, WHY AND HOW

The next phase is to answer When, Where, Why, and How these pieces and parts can come together to create the desired happening.

These four questions, when answered by the use of one or more of the twenty "Qualities", can provide the reasoning behind any design project. Then, not only can the qualities give visual meaning, but they begin to define a "Happening". Symmetry can provide order when an ordering is desired, rhythm can also provide an ordering, but it can also give direction. Vertical and horizontal provides the entire range or framework of human movement, and so on throughout the list of "Qualities".

It is the responsibility of the designer to determine, When, Where, and Why, these orderings, directions, or frameworks are necessary. Answering these questions is the most difficult part of the design process. Not only does the designer need to

know the affect of a particular arrangement on the user, but he must understand When, Where, and Why to use the affect. Answering the question of "How" can give variety and interest to the composition, and there is always room for a new way to answer how.

Even though the four questions (When, Where, Why and How) can be treated on a much higher intellect level, maybe they should not be. Possibly, this is one of designs biggest problems, that, the simple elements of Line, Plane and Volume are treated on too high a level that it escapes our level of reality. Architecture should not be verbalized; but should be used and felt by the senses, particularly, the senses of sight and touch.

Design is a very complex happening, there are so many thoughts and restrictions going on at the same time, that it can be difficult to come out ahead in the end. Even understanding and answering When, Where, Why, and How does not guarantee a successful design.

CREATING VOLUME (MASS AND SPACE)

This understanding can be one part in the striving
of an individual, to achieve an ability to create
"good" architecture.

CREATING VOLUME (MASS AND SPACE)

To create volume there must be intersections of line and plane. Therefore, intersections and their connections are of great importance in the creation of "good" architecture. The Figures 15 through 26 are only a few examples of the types of intersections that can happen when line and plane meet. Each connection between elements is relatively simple in occurrence, but each creates its own perceptual force upon the observer. The understanding of these forces will help the designer better deal with ideas like light, airy, heavy, solid, massive, strength, etc. This understanding will become an integral part of an architectural happening.

These examples are all done using line and plane, but they are surrounded by individual limits. These may be units of expansion, of movement, of time, or of space. But the architect has the ability to allow

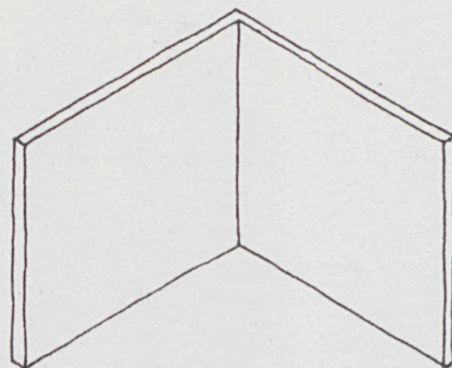


Fig. 15

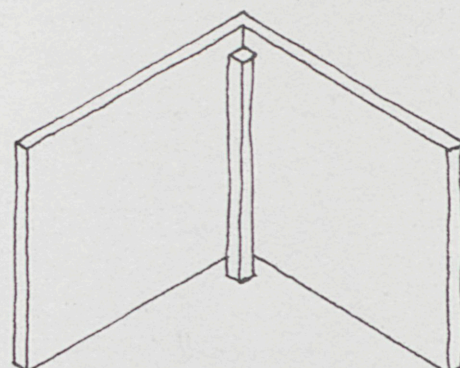


Fig. 16

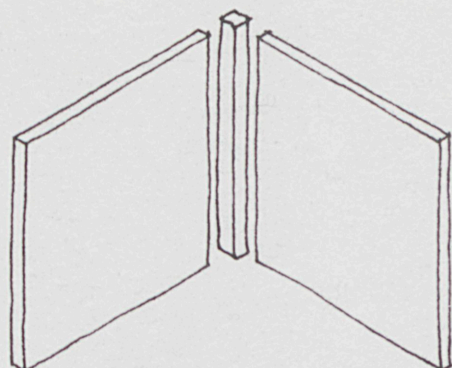


Fig. 17

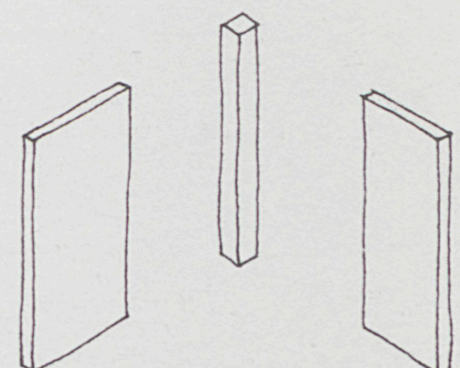


Fig. 18

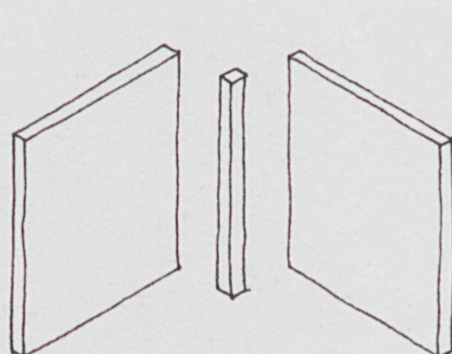


Fig. 19

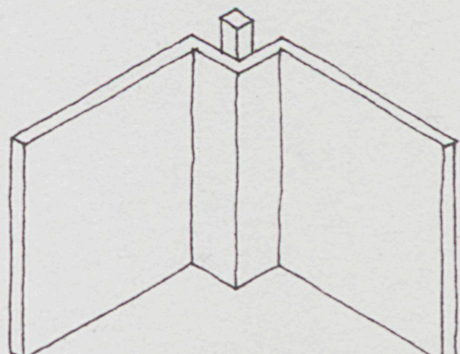


Fig. 20

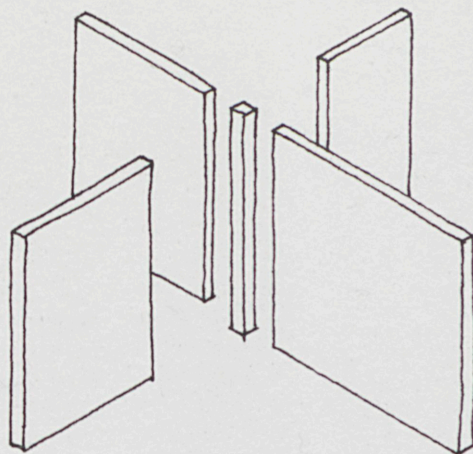


Fig. 21

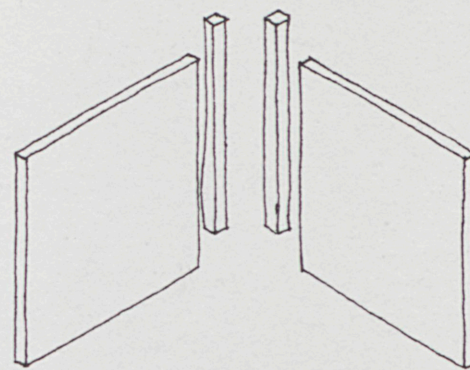


Fig. 22

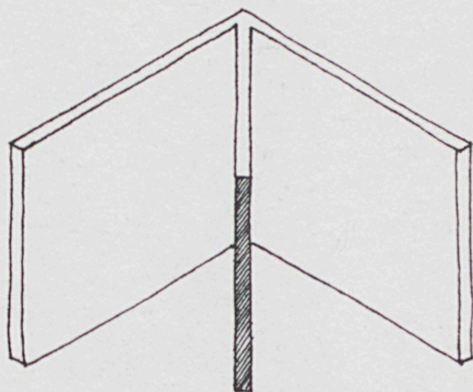


Fig. 23

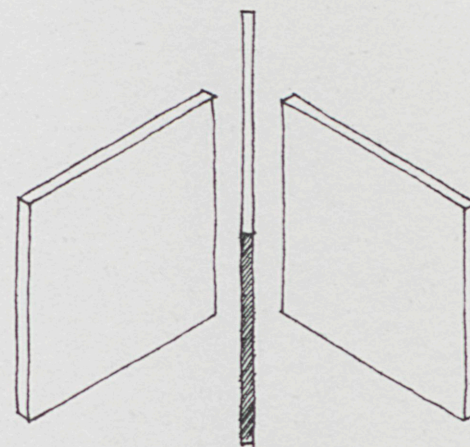


Fig. 24

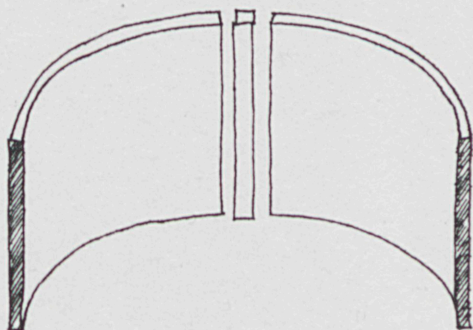


Fig. 25

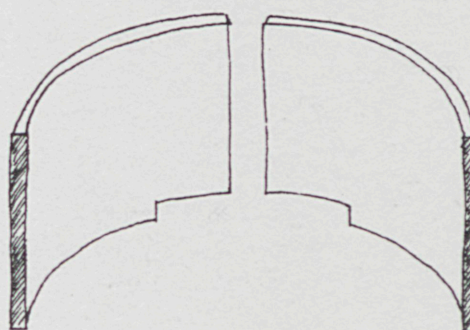


Fig. 26

these elements of line and plane to break away from its boundaries; to give scale, as in proportion, time, and appropriateness; to give movement and create volume. (See Figures 27 and 28) He can make vertical and horizontal space, give a simple form an idea and meaning. He can give complexity and context. (See Figures 29 and 30)

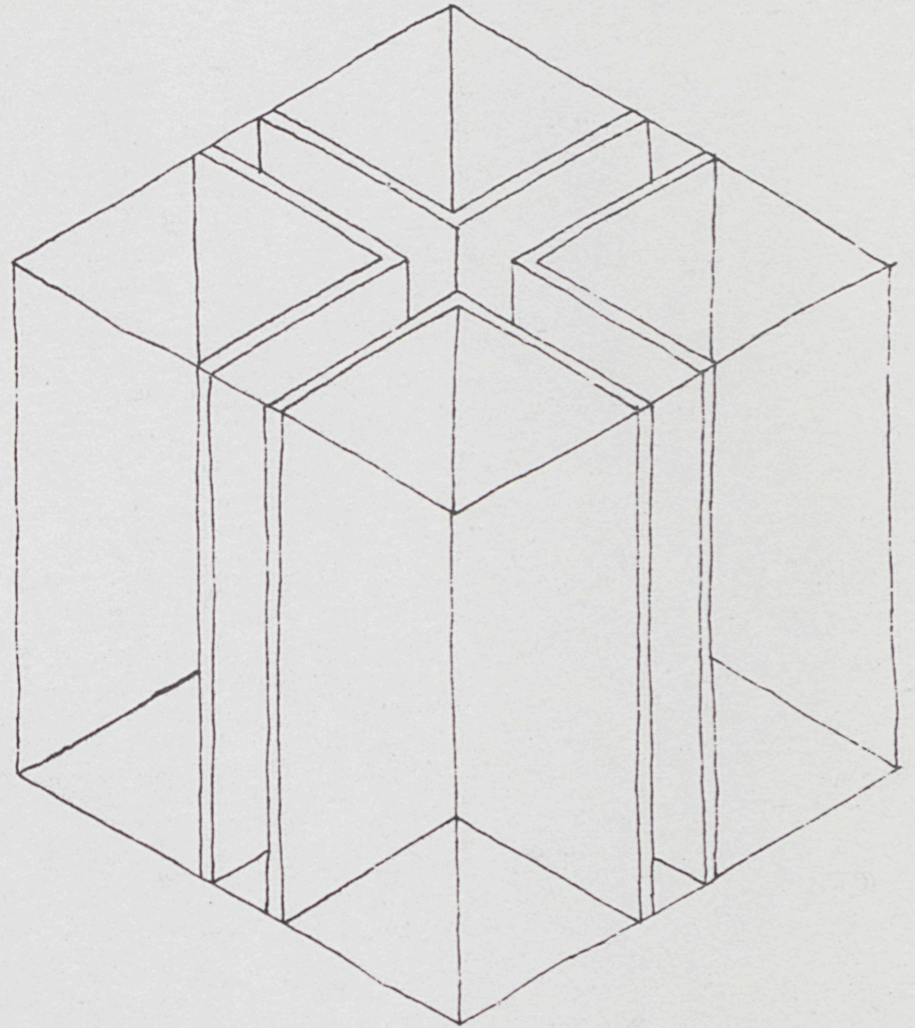


Fig. 27

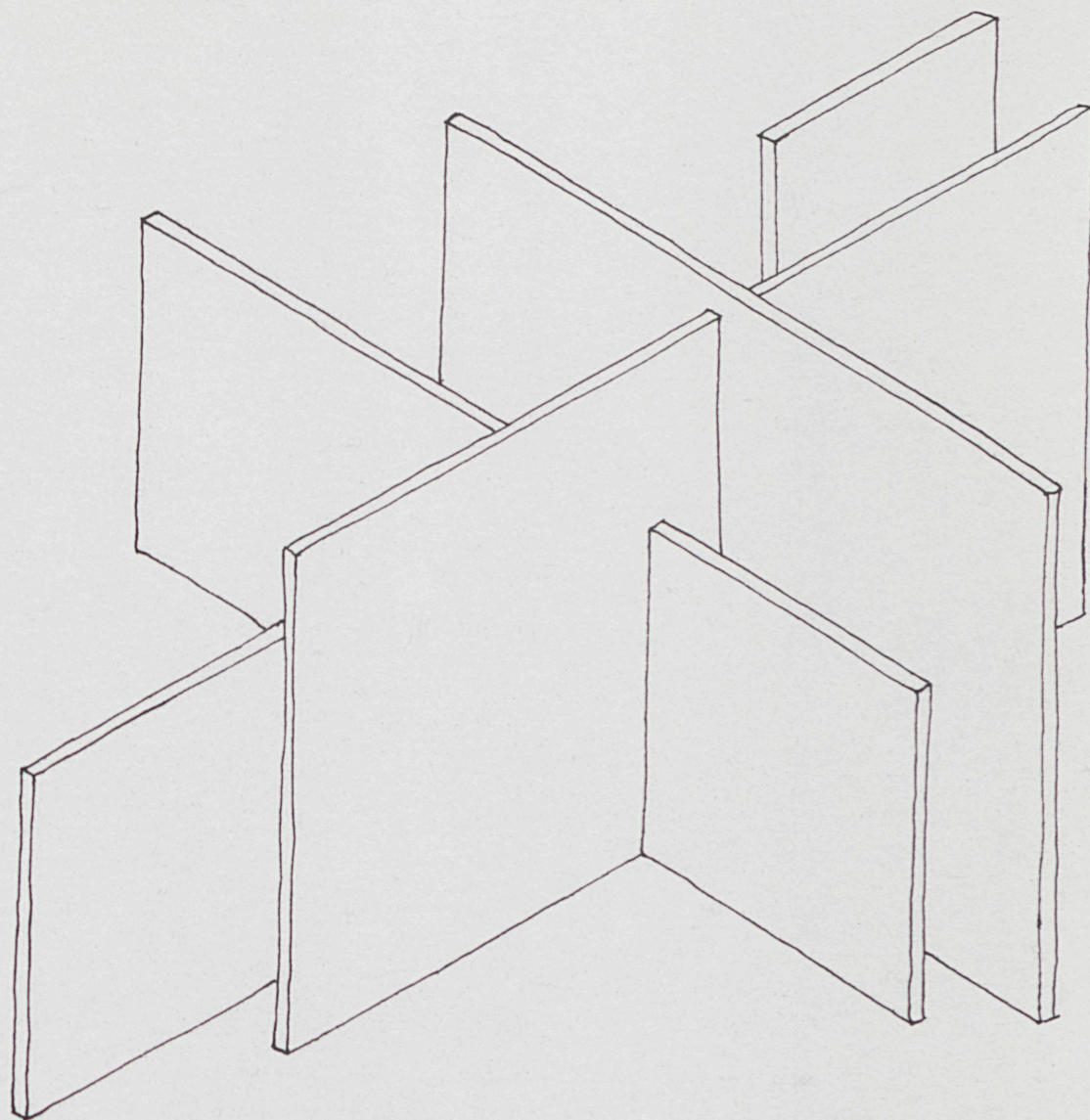


Fig. 28

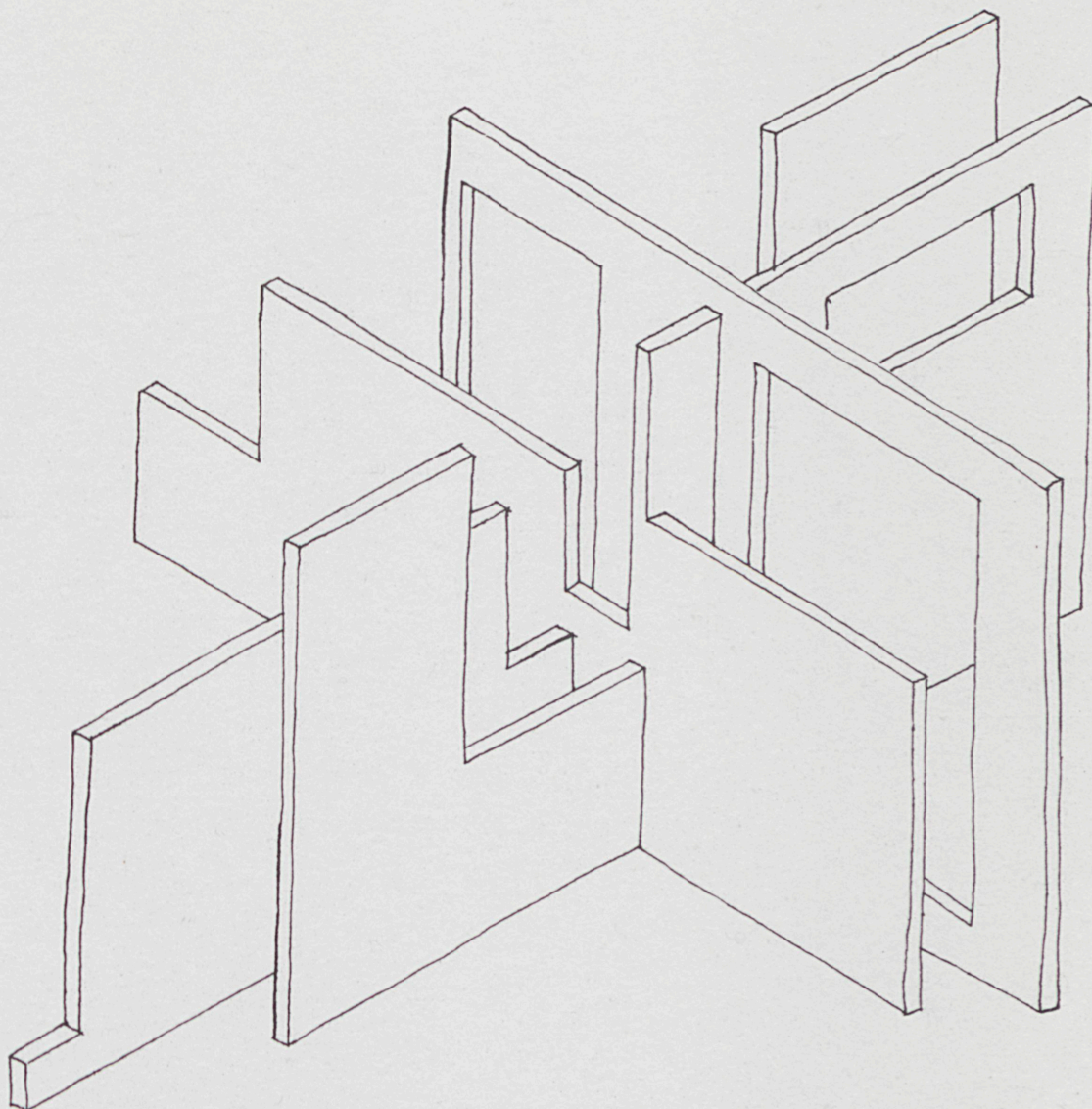


Fig. 29

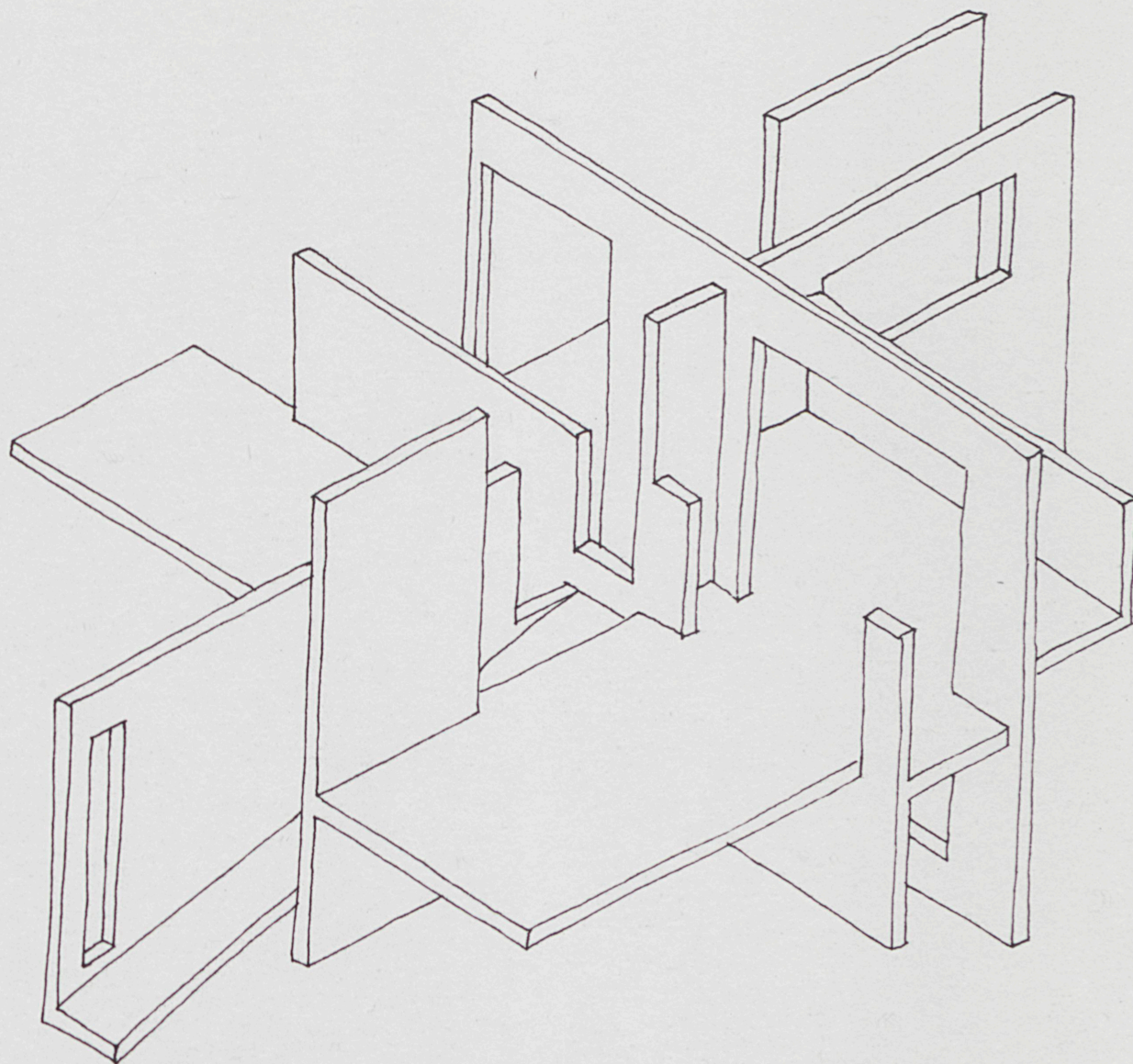


Fig. 30

THE PROGRAM (CONCEPTUAL)

The previous four figures become the splitting point between first and second quarters of thesis. First quarter thesis was dealing with the conceptual qualities of architecture. Now as the progress of the four figures grow one step more, (See Figure 31) there becomes a need to realize actual "functional" space. "Functional" not in the specifics, but in the generalities. Since specific function was not the controlling thought, areas of function like drafting rooms, dentist's offices, doctors offices, administrators office, etc. could now be lumped into the function of work space. Other specific functions now become eating, gathering, arrival (entry), departure (exit), viewing, sitting, standing, walking, and talking. These general functions now have to take on a physical form. Each of these functions are explored in terms of what is necessary for them to exist. Each of these functions are given several

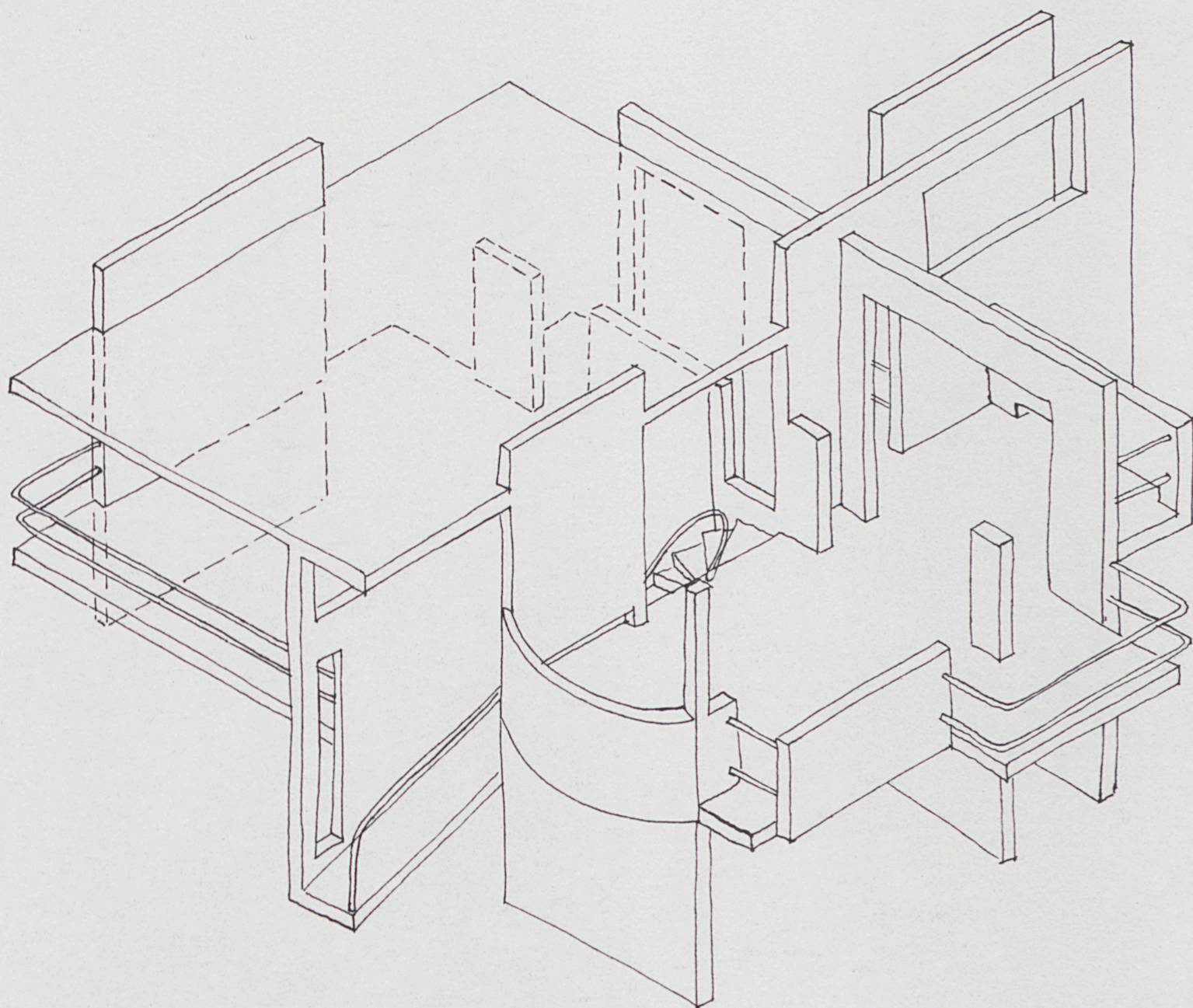


Fig. 31

sub-ideas and it is in terms of these ideas that
give the character or quality suitable to a
particular function.

ARRIVAL (ENTRY)

Scale
 Transition
 Recognition
 Puncture
 Enclose
 Slowing (Speed)
 Organized
 Dominance
 Lead

DEPARTURE (EXIT)

Transition
 Speed
 Movement
 Scale
 Lead

WORK

Quantity
 Private
 Public
 Specialized
 Ordinary

TALK

Introvert
 Extrovert
 Motion
 Group

PLAY

Inside/Outside
 Age
 Scale

GATHERING

Quantity
 Public/Private
 Light
 Sitting
 Standing
 Scale

VIEW

Waiting
 Alone
 Group
 Outside/Inside
 Penetrate
 Layer

WALK

Motion
 Change
 View
 Direction
 Scale

EATING

Introvert
 Extrovert
 Light
 View

SIT

Rest
 Wait
 Eat
 Work
 View

FEEL

Touch
 Sense
 Visual
 Texture

Three other categories prove to be of great importance
 in controlling a space.

LIGHT

Natural
Artificial
Intensity (Quantity)
Quality
Directional

INTROVERSION

Quiet
Alone
Light (Dim-Dark)
Soft
Closed

EXTROVERSION

Loud
Open
Group
Outgoing
Bright

But this discovered composite space needs more context. To help with this gap in thought, a site must be chosen, where this composite space can be contained and controlled.

THE SITE (ASPECTS OF REALITY)

A site specifies a boundary around a part of a large, more complex whole. The choosing of a site gives the composite space a format and context. The composite space in its three dimensional form, now must interact directly with the land and its surrounding environment (sun, wind, snow, rain, view, and etc.).

The choice of a site creates some problems. Not only does there need to be plenty of space to accept these composite spaces, but there has to be a general lack of identity.

A suitable site is found just off the east tip of Main Street, Bozeman, Montana. (See Figure 32) Wrapped on three sides by elevated interstate road, this site provides the room necessary, and also provides the environmental reality to begin on this kind of composite approach. The problem of site identity or contextual independence can never be totally alleviated. Everything is interrelated either physically or

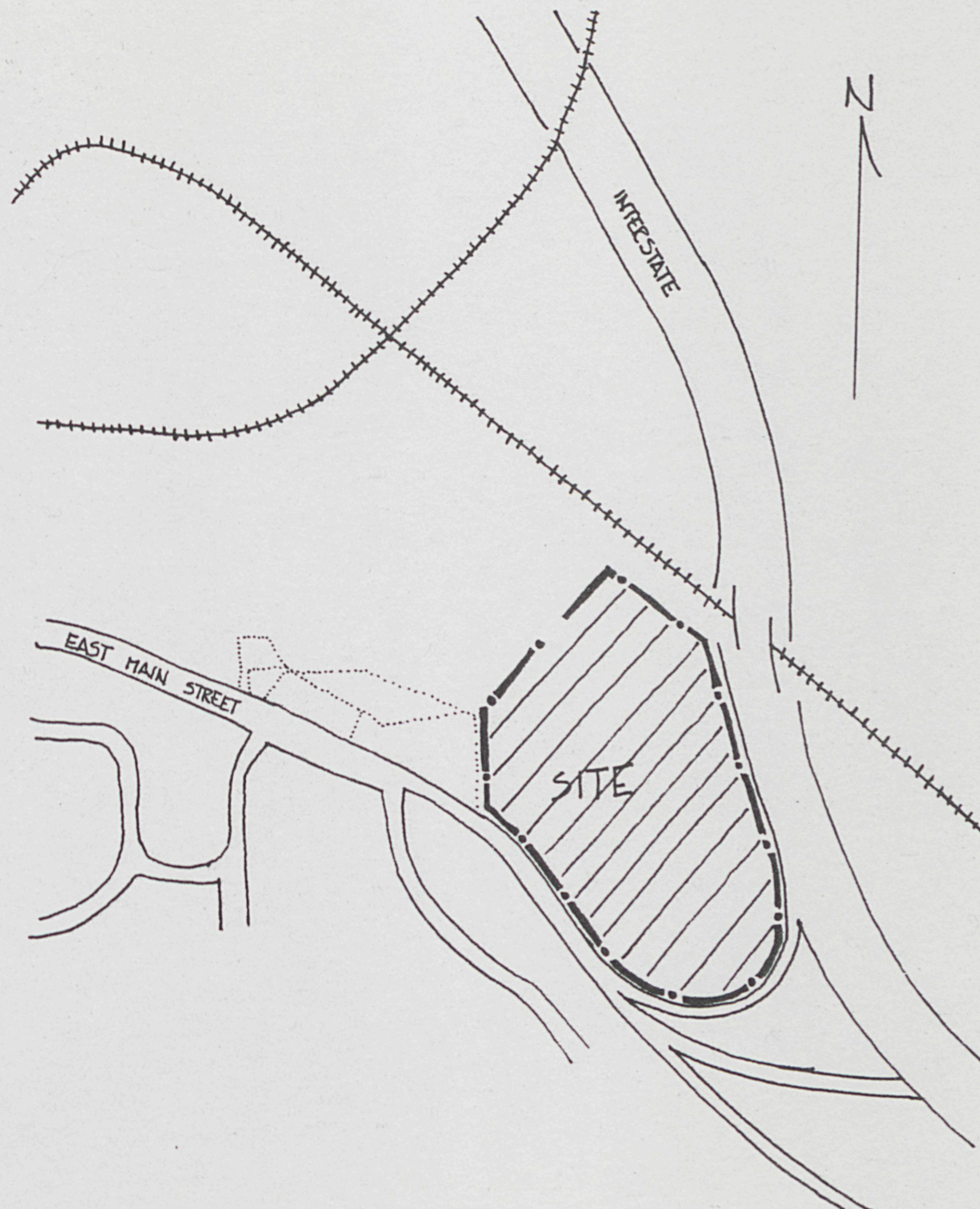


Fig. 32

psychologically. Context becomes a different problem. Context gives design the emotional basis, and is the meaning and generator of the design process. Within this thesis, identity or imagery will not be completely dealt with, and resemblance to a building type is purely accidental.

This east Main site appears to contain little of this identity or context. Within the site a few rooftops are the only hint that the town of Bozeman exists.

The site is bound on the east side by an elevated four laned interstate which runs to the east. On the south, an exit ramp swings off the interstate in a gentle circular curve connecting with Main Street on the west side. A view of the Bridger mountains frame the north side. From the site two horizontal bridges can be seen, one of a railroad trestle, and the other of an interstate overpass.

A BUILDING (COMPOSITE) COMPOSITION

The actual design includes the incorporation of the site and the ideas of composite space into a whole. Since the design is to be a building composition, filled with architectural phenomenon of composite space, it is very difficult to talk about the ideas and orderings that happen in the beginning of this design stage. Design happens on both an intuitive and rational basis, just as any other design.

Physically, the first ordering system in the design is the imposition of an orthogonal grid twenty feet square, laid parallel to the edge of Main Street. The basic importance of this grid is to help impose an overall order and establish physical boundaries. These boundaries are not to restrict a happening. This grid helps establish reference points for the curvilinear line and also functions as a describer of structure.

The second ordering system responds to the angle of the interstate on the east side. This rotation of the grid, approximately thirty five degrees, creates an overlap of systems which is hard to connect. Resolution of this overlapping allows both ends of the composition to use both systems, and the middle retains only the first system.

The building composition on the south sweeps around on itself in a circular manner. This reflects the curve of the exit ramp, and is tied back to the composition by a walk bridge. The north end butts up against Main Street to accept the incoming user. The total design is a conglomeration of ideas and architectural happenings. Hopefully, without over-verbalizing the design, the ordering levels and the ideas will be present in the actual visual aids shown in the next section.

THE CONCLUSION

This thesis, from the start, has proven to be very personal. No longer is the main idea to turn out a building, but to explore the problems and possibilities of combining designed space, program, and structural reality. In this thesis, as in most cases of purely designed space, space loses in the final form. Not directly because of the designer, but on many of the restrictions placed upon him. This thesis and project approach has illustrated, it is possible to create architecture as a whole, one in which all the "pieces" and "parts" whether physical or ideological work together. In spite of the fact that specific functional requirements were not applied in the programming of this thesis, very little was lost and a lot gained. Although all the questions and conflicts which came up during this thesis have not been resolved, it provides a valid foundation stone upon which to build.

"All human needs are matters of the mind. Hunger pangs, the chills of winter, the fear of violence, and disturbance from noise are all facts of human consciousness. It makes little sense to distinguish between them by attributing some to the body and others to the mind. The hunger, the chill, and the fear are on equal footing with the needs for peace, privacy, space, harmony, order or color. To the best of psychologist's knowledge, these priorities are by no means self-evident. Dignity, a sense of pride, congeniality, a feeling of ease - these are primary needs which must be seriously considered when the welfare of human beings is under discussion. And since they are requirements of the mind, they are satisfied not only by good plumbing, heating, and insulation, but equally by light, congenial colors, visual order, well proportioned space and so forth"?

QUOTATIONS

1. Sanoff, Henry, Visual Attributes of the Physical Environment, (Raleigh: North Carolina State University, 1969) p.3.
2. Wyatt, Stanford, Arch. 154 Design Program Hand-Out, (Bozeman: Montana State University, 1977), p.13.
3. Banham, Reyner, Theory and Design in the First Machine Age, (New York: Praeger Publishers, 1967), p.141.
4. Arnheim, Rudolph, The dynamics of Architectural Form, (Berkeley: University of California Press, 1977), p.18.
5. Banham, Reyner, Theory and Design in the First Machine Age, p.140.
6. Arnheim, Rudolph, The Dynamics of Architectural Form, p.33.
7. Banham, Reyner, Theory and Design in the First Machine Age, p.142.
8. Ibid., p.142.
9. Arnheim, Rudolph, The Dynamics of Architectural Form, p.3.

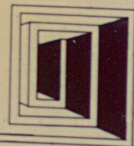
SELECTED BIBLIOGRAPHY

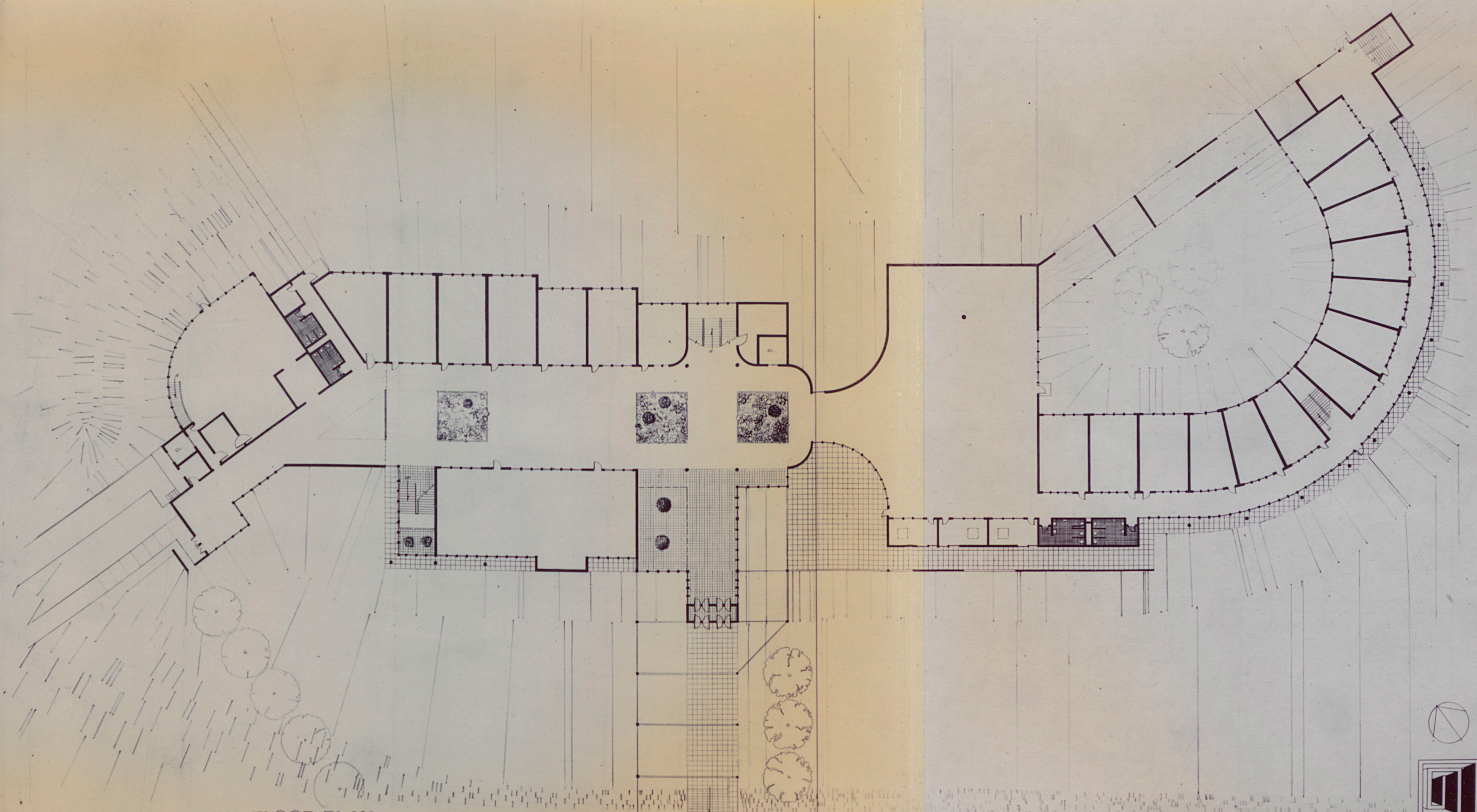
- Arnheim, Rudolph, The Dynamics of Architectural Form, Berkeley: University of California Press, 1977.
- Ashihara, Yoshinobu, Exterior Design in Architecture, New York: Reinhold Pub. Corp., 1970.
- Banham, Reyner, Theory and Design in the First Machine Age, New York: Praeger Publishers, 1967.
- Garrett, Lillian, Visual Design, New York Reinhold Pub. Corp., 1967.
- Green, Herb, Mind and Images, Lexington: University Press of Kentucky, 1976.
- Kepes, Gyorgy, Language of Vision, Chicago: P. Theobald, 1944.
- Le Corbusier, Towards a New Architecture, London: Percy Lund, Humpries & Co. Ltd., 1946.
- Sanoff, Henry, Visual Attributes of the Physical Environment, Raleigh: North Carolina State University, 1969.
- Stephen, George, Remodeling Old Houses, New York: Knopf, 1972.

EAST MAIN

INTERSTATE 90 EAST

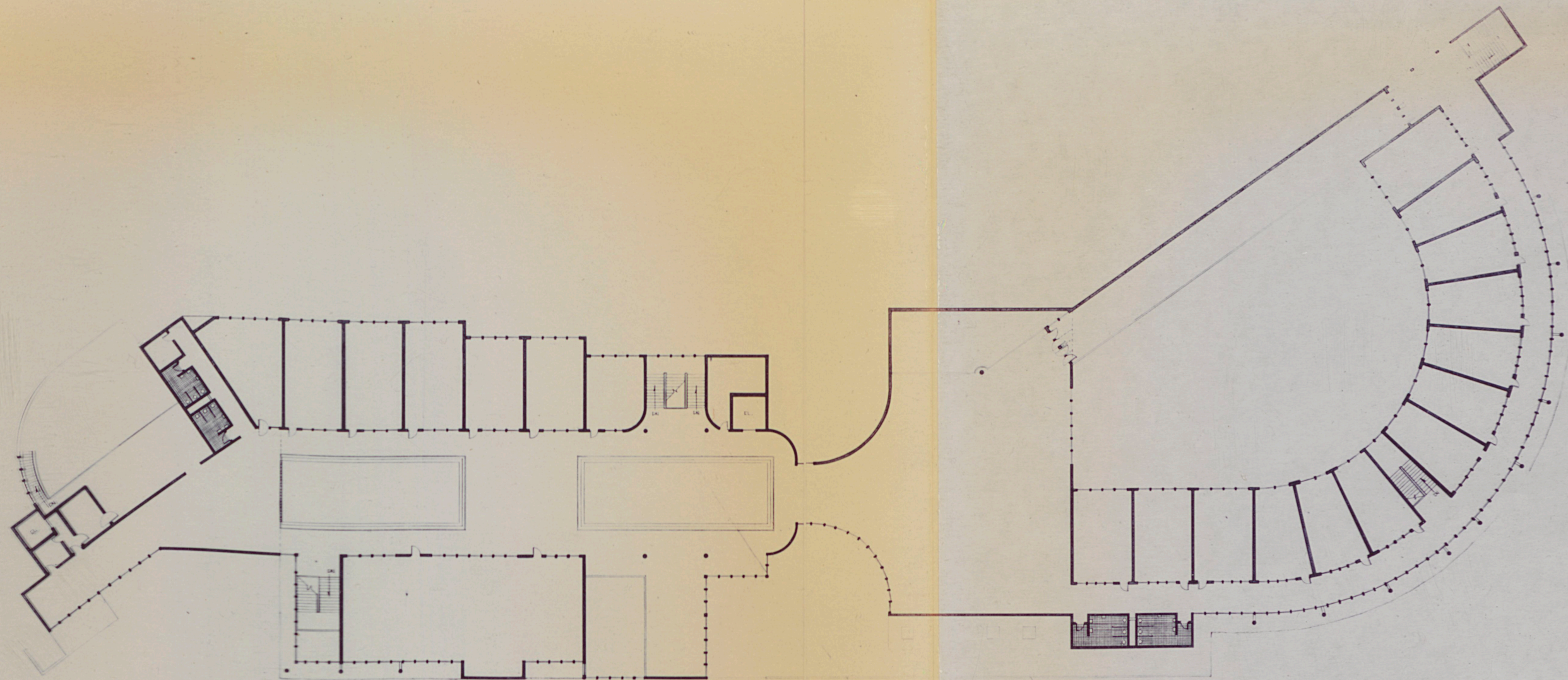
SITE PLAN 1"=50'-0"





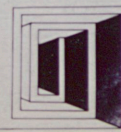
GROUND FLOOR PLAN 3/22-1-01

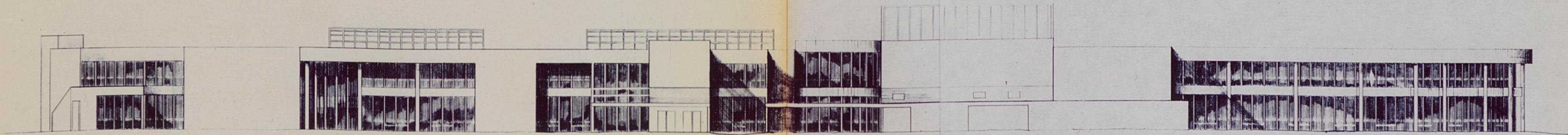




2ND FLOOR PLAN

3/25-1-6



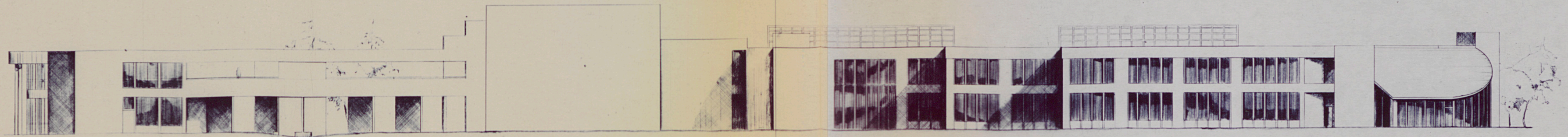


SOUTH ELEVATION

ELEVATION

3/32-1-0



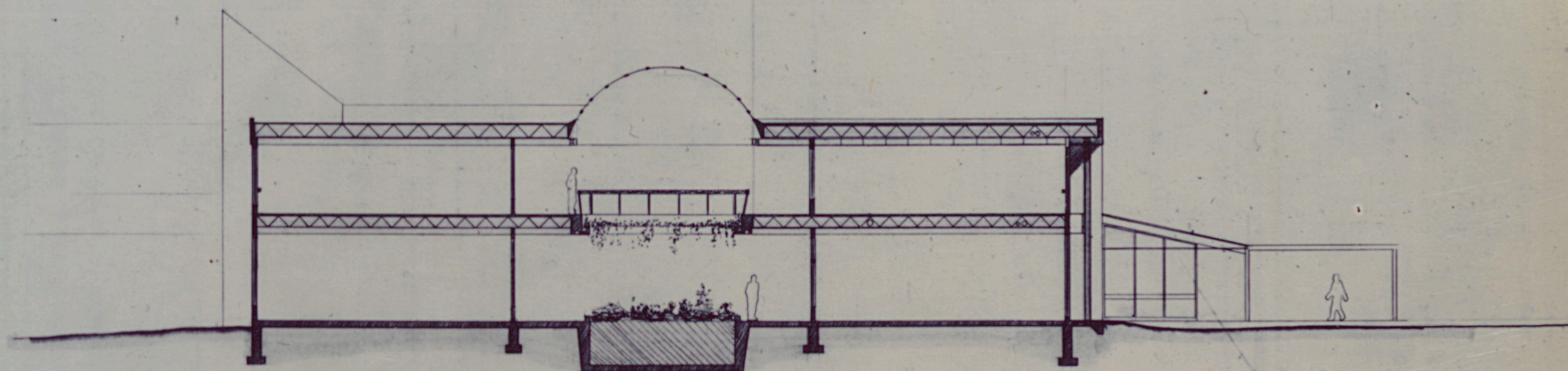


NORTH ELEVATION

ELEVATION

3/32'-1'-0"

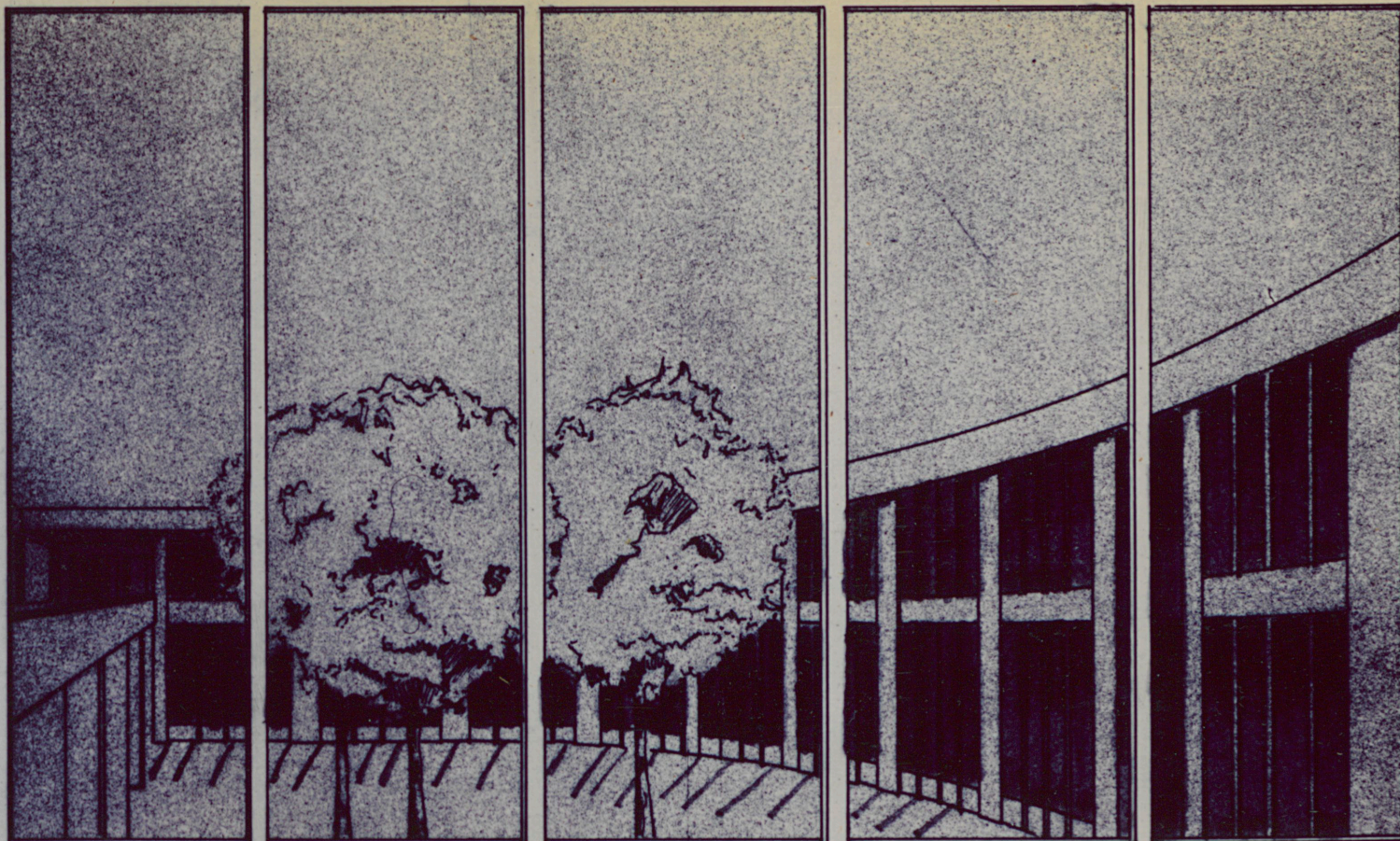




SECTION

1/8" = 1'-0"



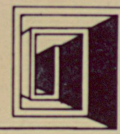


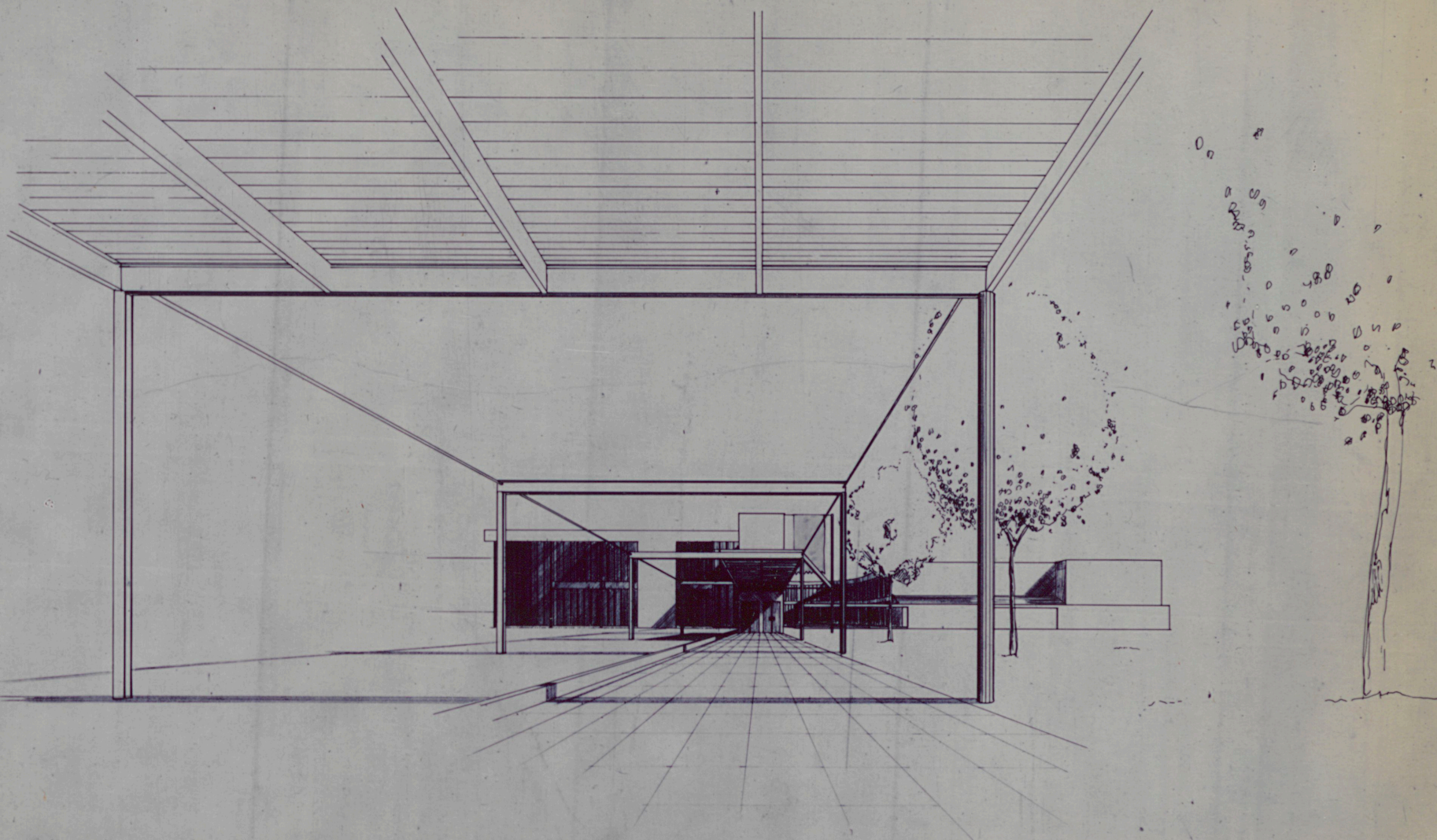
COURT VIEW

PERSPECTIVES

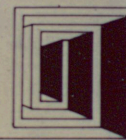


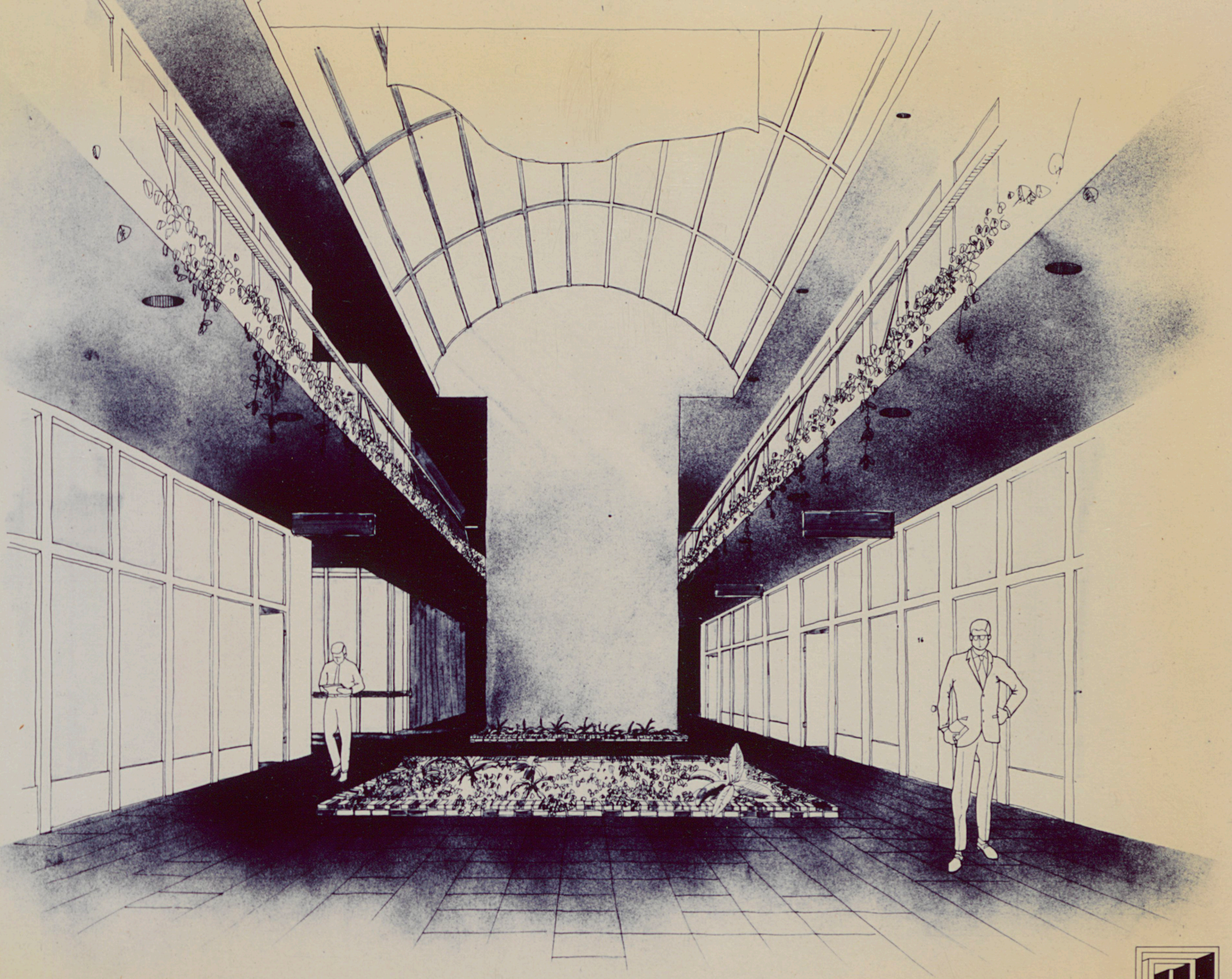
INTERIOR CORRIDOR



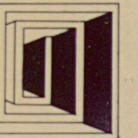


ENTRY PERSPECTIVE





INTERIOR PERSPECTIVE



MONTANA STATE UNIVERSITY LIBRARIES CA
stks 720.6.M76H711
Line, plane and volume : a building comp
3 1762 00157623 8

~~NA 2540~~
~~720.6~~
~~M76~~
~~H711~~

