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A Research/Living Facility

Undergraduate Thesis in Architectural Design

By

Terral Dean Sukut

Submitted to the School of Architecture as

Partial Fulfillment of the Requirements for

The Degree of Bachelor of Architecture

At

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Bozeman, Montana

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Approved:

Advisor _____

Date 6/13/78

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Acknowledgements

This thesis represents the culmination of a very important chapter in my life and I would like to acknowledge those responsible for making it happen. To begin with, my advisor, Mr. Ilmar Reinvald, whose guidance afforded the solution. To the persons on the staff of the School of Architecture; to my friends, Tom, Mike, Dave and John, and lastly to my family for not only the financial backing but also the spiritual backing they have given me in the past five years. To all, Thank you.

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PRIMER

Primer

The intent of this thesis is to investigate the interaction between man and building; the relationship of both the user and his input into the design system as well as the product of that system, the building and what makes it a lasting entity.

I shall first look at users and systems by which user information can by analysed and incorporated into the design process. Next I will look at built architecture and try to determine those ideas of design elements which make buildings live on in the minds of their beholders. The culmination of these studies will be an attempt to design a building which can respond to unpredictable user needs for the extended life of the building.

it is not the intent of this thesis to make any conclusive statements as to what makes architecture an active part of our environment, but rather to explore how architecture can best serve its "master" without dying after he is gone.

STATEMENT

Thesis statement

The inherent quality of timeless architecture is achieved only when the immediate needs of the present user are in balance with the basic inborn characteristics of the building.

PART 1
USER STUDY

Introduction

The process under which America was built is based on the "Melting Pot Theory": the emergence of a homogeneous whole from diverse inputs.

Thus the motto----

E PLURIBUS UNUM

Translated from Latin reads

Out of Many One

This motto describes the underlying attitude of a large part of the American system, and for Architecture:

Out of many users comes life.

(Figure 1)

Traditional Process

The basic process of decision making in the traditional design process is one of direct application of users' ideas in both design and construction. People have inherent needs to make active decisions about their environment, the need to create and the need to have some control (ownership) over what they create.

(Figure 2)

Professional Process

With the incorporation of a professional, the process of decision making is passed from the user to the professional who must in turn make those decisions on the basis of his perception of how the user lives and then make the translation to a product for that user. Problems occur here just by virtue of communication and information gaps. The time required is also a hinderance due to its economic feasibility.

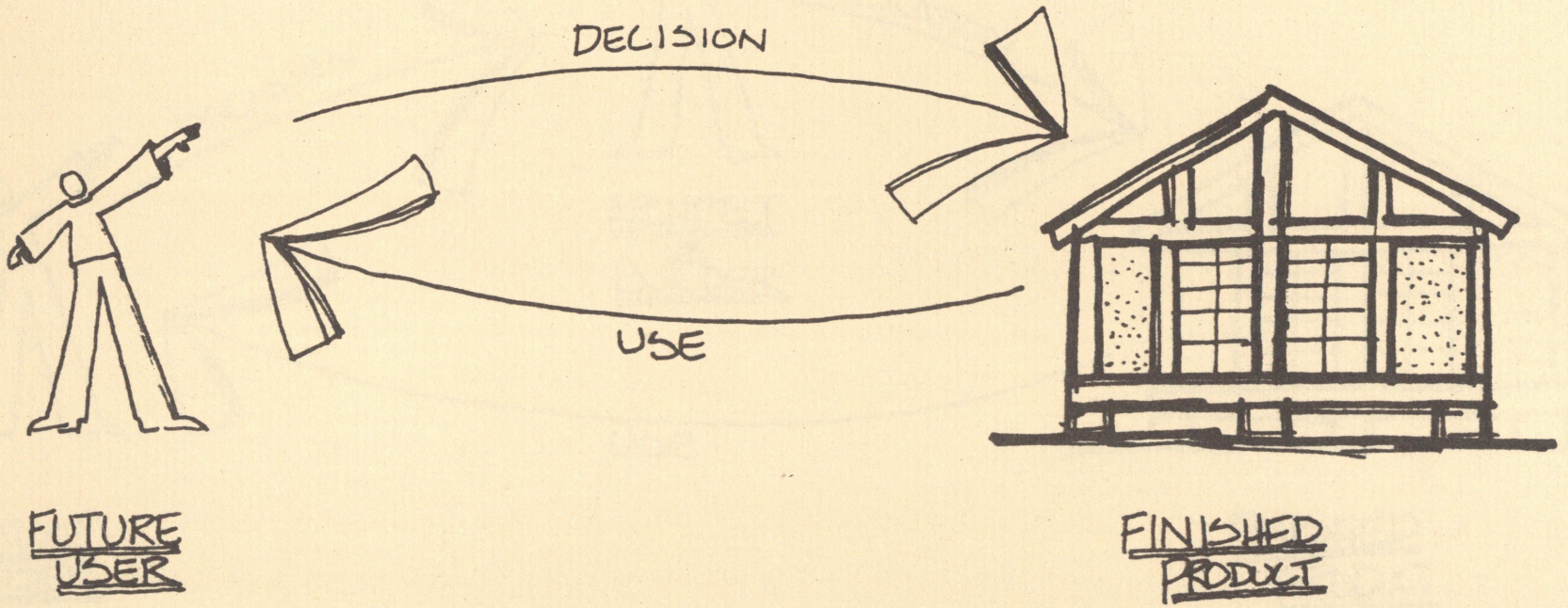


Fig. 1

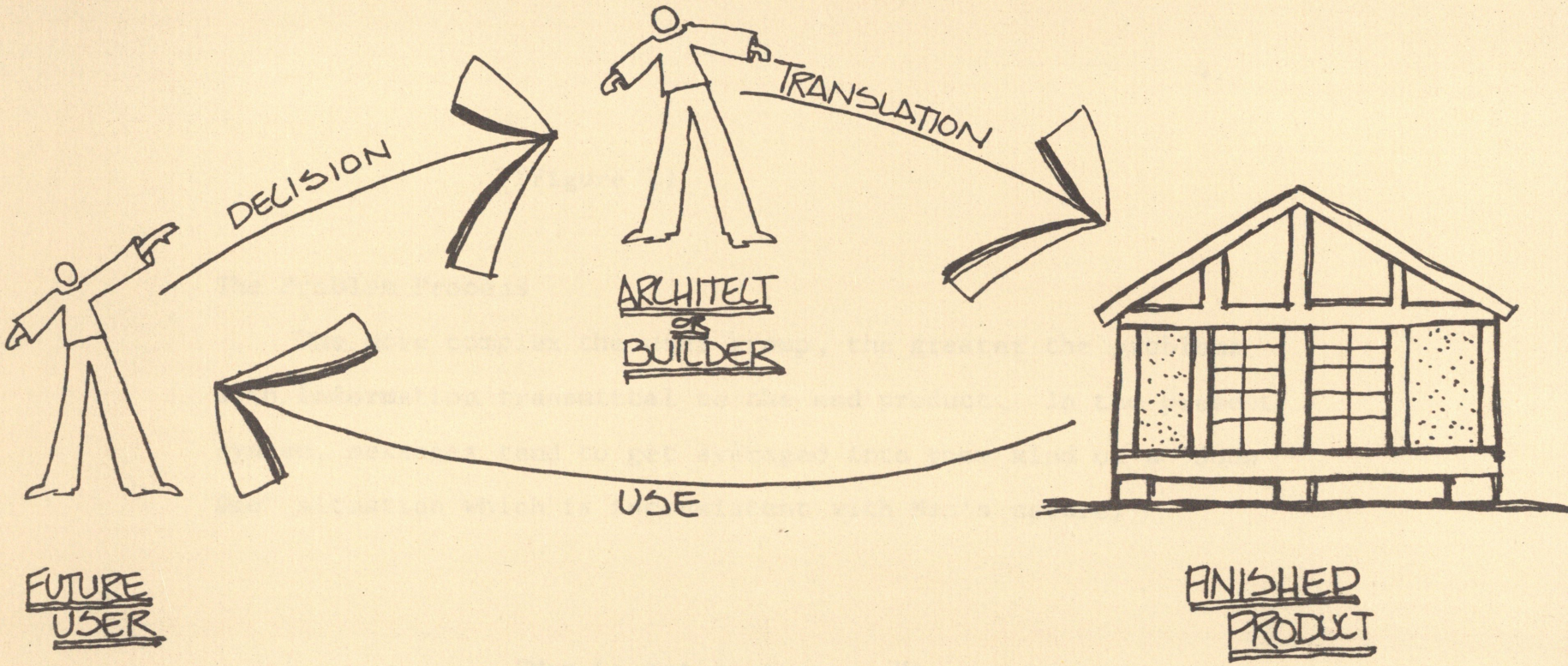

DECISION
TRANSLATION
ARCHITECT
or
BUILDER
USE
FUTURE
USER
FINISHED
PRODUCT

Fig. 2

(Figure 3)

The Problem Process

The more complex the user group, the greater the problems with information transmittal to the end product. In the present system, messages tend to get averaged into some kind of a "John Doe" situation which is inconsistent with Man's nature.

"Man is not an average."

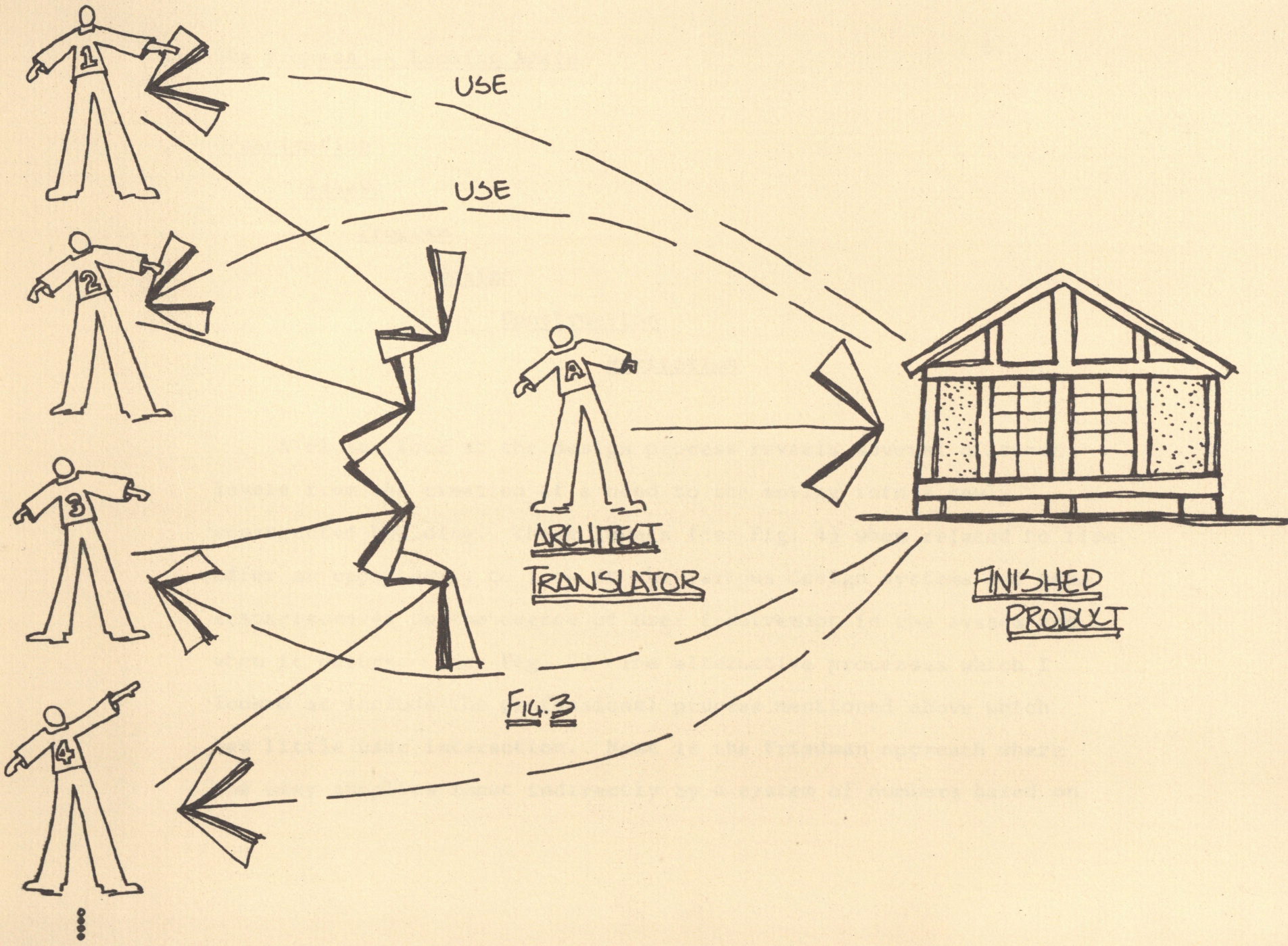


FIG. 3

The Process -- Looking Again

Organization

Assess

Program

Design

Construction

Habitation

A closer look at the design process reveals several distinct levels from the creation of a need to the moving into a newly constructed building. These levels (See Fig. 4) when related to time offer an opportunity to look at the various design systems and make comparisons as to the degree of user involvement in the system and when it occurs. (See Fig. 5) The alternative processes which I looked at include the professional process mentioned above which has little user interaction. Next is the Friedman approach where the user supplies input indirectly by a system of numbers based on

FIG. 4 PROCESS OUTLINE

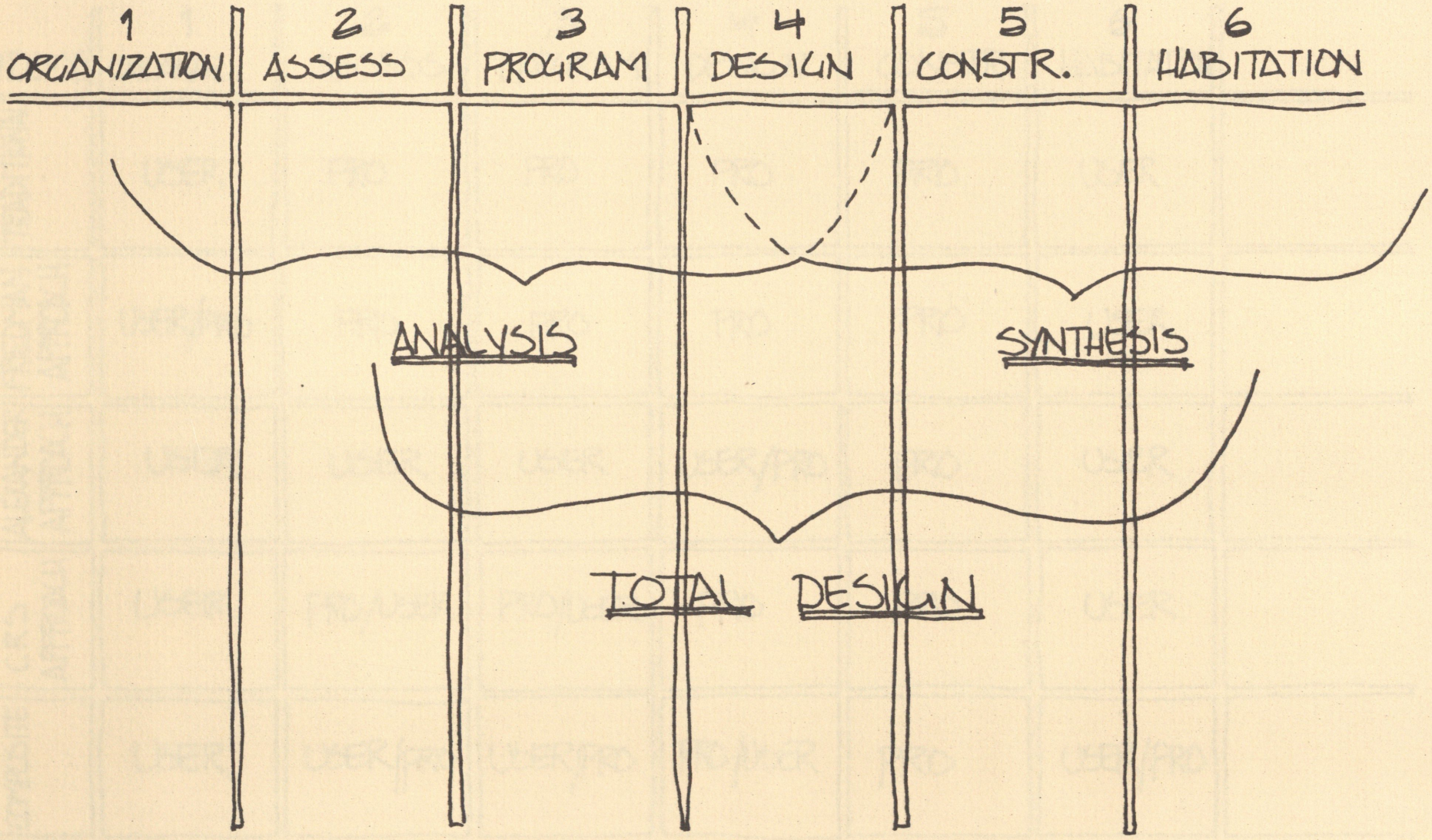


Fig. 5 PROCESS OUTLINE

INPUTS INTO THE DESIGN PROCESS IN RELATION TO TIME

PROCESS	1 ORGANIZ.	2 ASSESS	3 PROGRAM	4 DESIGN	5 CONSTR.	6 HABITATION	
TRADITIONAL	USER	PRO	PRO	PRO	PRO	USER	
FRIEDMAN APPROACH	USER/PRO	PRO	PRO	PRO	PRO	USER	
ALEXANDER APPROACH	USER	USER	USER	USER/PRO	PRO	USER	
CRS APPROACH	USER	PRO/USER	PRO/USER	PRO	PRO	USER	
COMPOSITE	USER	USER/PRO	USER/PRO	PRO/USER	PRO	USER/PRO	

frequency of use of assigned spaces.[1] Next we have the Alexander approach which advocates complete user input and only brings in professional help after the schematic design is established.[2] The CRS approach involves the incorporation of the user or user group as an active member of a programming team which allows for a good exchange of ideas between users and architects.[3]

From the alternative design processes which I have looked at, I drew together a composite category which is basically user oriented but with professional architectural help from the beginning. A look at the composite levels of analysis or process outline shows the following:

1. Organization: Decision of an individual or group of individuals to join together and act on problems concerning their immediate environment.
2. Assess: A critical assessment by both the group and professionals as to the current situation within its context.

3. Program: The establishment of a team including representatives from both the user group and the professional group. The team is to program the requirements of the proposed project.

   Concerns:[4]

   A) Establish goals.

   B) Collect and Analyze facts.

   C) Uncover and test concepts.

   D) Determine needs.

   E) State the problem.

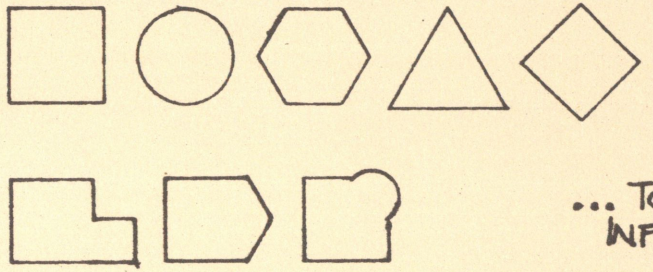
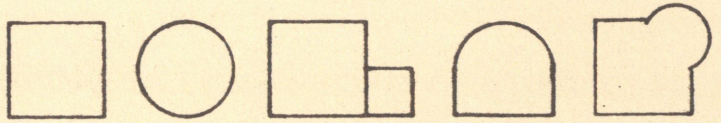
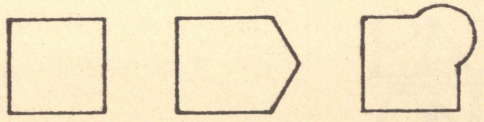
4. Design: Actual site and building design based on problem statements provided by the programming team. The end product of this stage are contract documents.

5. Construction: Actual site work and building construction.

6. Habitation: Use of buildings by the clients and a reassessment of the revised situation, within its context.

To sum up the user study, Figure 6 shows the positive aspects of user involvement in the design system. When the users are called upon to help in planning, the chances of success are even greater because architecture relates to human values and human values relate to personal participation in the design process which relates to an identity with the product and in the end, satisfaction with one's actions.

Fig. 6 CONCLUSION

	POSSIBLE SOLUTIONS	QUALITY INDEX
IDEAL OPTIONS — ALL THE PERCEPTIONS OF POSSIBILITIES	 ... TOWARDS INFINITY	.5
DESIGNER OPTIONS LIMITED BY VIRTUE OF INDIVIDUAL HUMAN PERCEPTION		.75
DESIGNER/USER OPTIONS LIMITED BY VIRTUE OF PERSONAL PREFERENCE OF WANTS AND NEEDS		.95

PART 2
ON ARCHITECTURE

Part 2 On Architecture

Introduction

The phrase "Timeless Architecture" was used at the outset of this thesis and again used in the statement of thesis. I believe it is the key to the relationsship of man and his built environment and therefore would like to clarify the context with which the phrase is used.

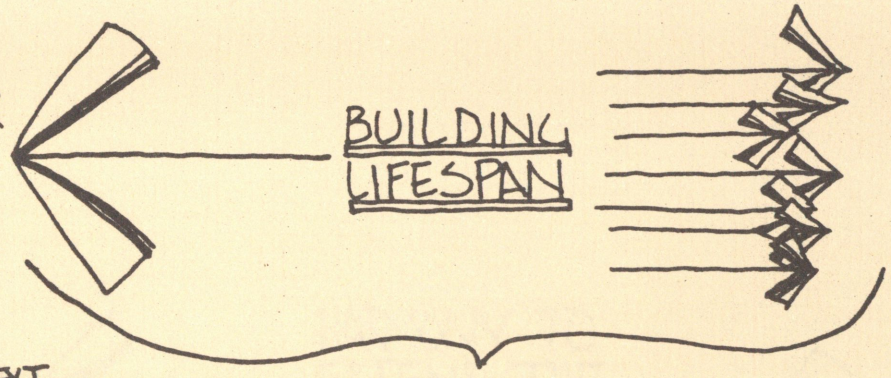
The basis for timeless architecture, as I see it, lies in the users of that architecture. If we assume that architecture is built for a user, the user has influenced the designer and the building is conceived so as to best serve that user. The paradox of this statement is that buildings far outlive users.

In order for architecture to live on after the first user it must contain certain inherent characteristics or elements which

are inborn to all lasting architecture. These characteristics or elements, psychological or physical provide the basis for a dynamic architecture. It is their interaction with the user and his immediate problems that perpetuate architecture that lives on and serves the many. (Fig. 7) (Fig. 8)

In my opinion, the key to understanding elements which generate timeless architecture lies in the contextual relationship of form. (Fig. 9) The response of form to form, part to part, defines a system or infrastructure; that fixed part of the building which is the base or bounds, that part of the building which provides an identity. I view this infrastructure as an organism for evolving patterns of association. It is these associations of form to form which dictates the emergence of scale. It is the perception of this scale or the proportion of the human scale to that of the built scale that is responsible for living architecture.

CONSTANT CHANGE OF OUR SOCIETY, THE TURNOVER OF SPACE AND BUILDINGS — CHANGES IN CONTEXT, USE AND USERS.



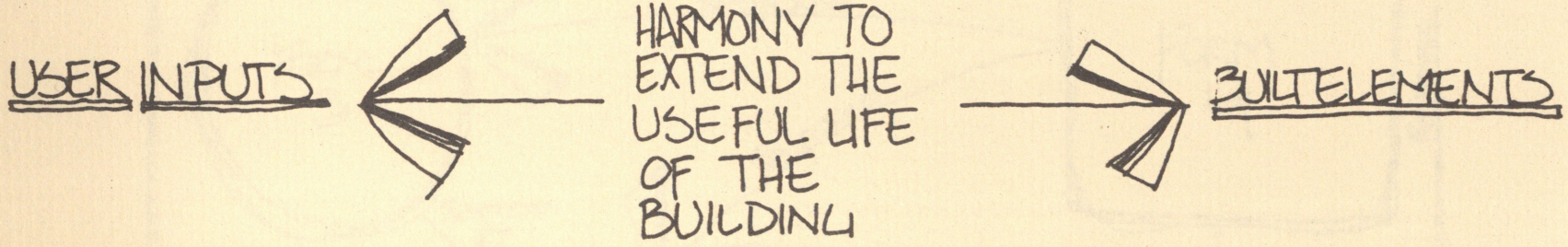
THOSE ELEMENTS OR CHARACTERISTICS WHICH MAKE THE BUILDING LIVE ON.

A BALANCE MUST BE ACHIEVED OR THE BUILDING WILL PERISH

"LIFETIME OF A BUILDING MEANS THE TIME SPAN IN WHICH IT CAN BE USED EFFICIENTLY IN ANY WAY WHICH SHOULD BE DETERMINED BY ITS USERS. IF USERS CANNOT USE A BUILDING ANY MORE IN THERE OWN WAY, THE BUILDING CAN BE CONSIDERED AS 'DEAD' EVEN IF IT IS NOT A RUIN OR DEMOLISHED."

YONA FRIEDMAN, TOWARDS A SCIENTIFIC ARCHITECTURE

FIG. 7



TIMELESS ARCHITECTURE IS AN ATTEMPT TO ACHIEVE A SENSE OF HARMONY BETWEEN THE CHANGING USERS OF A BUILDING AND THE ELEMENTS OF THAT BUILDING.

Fig. 8

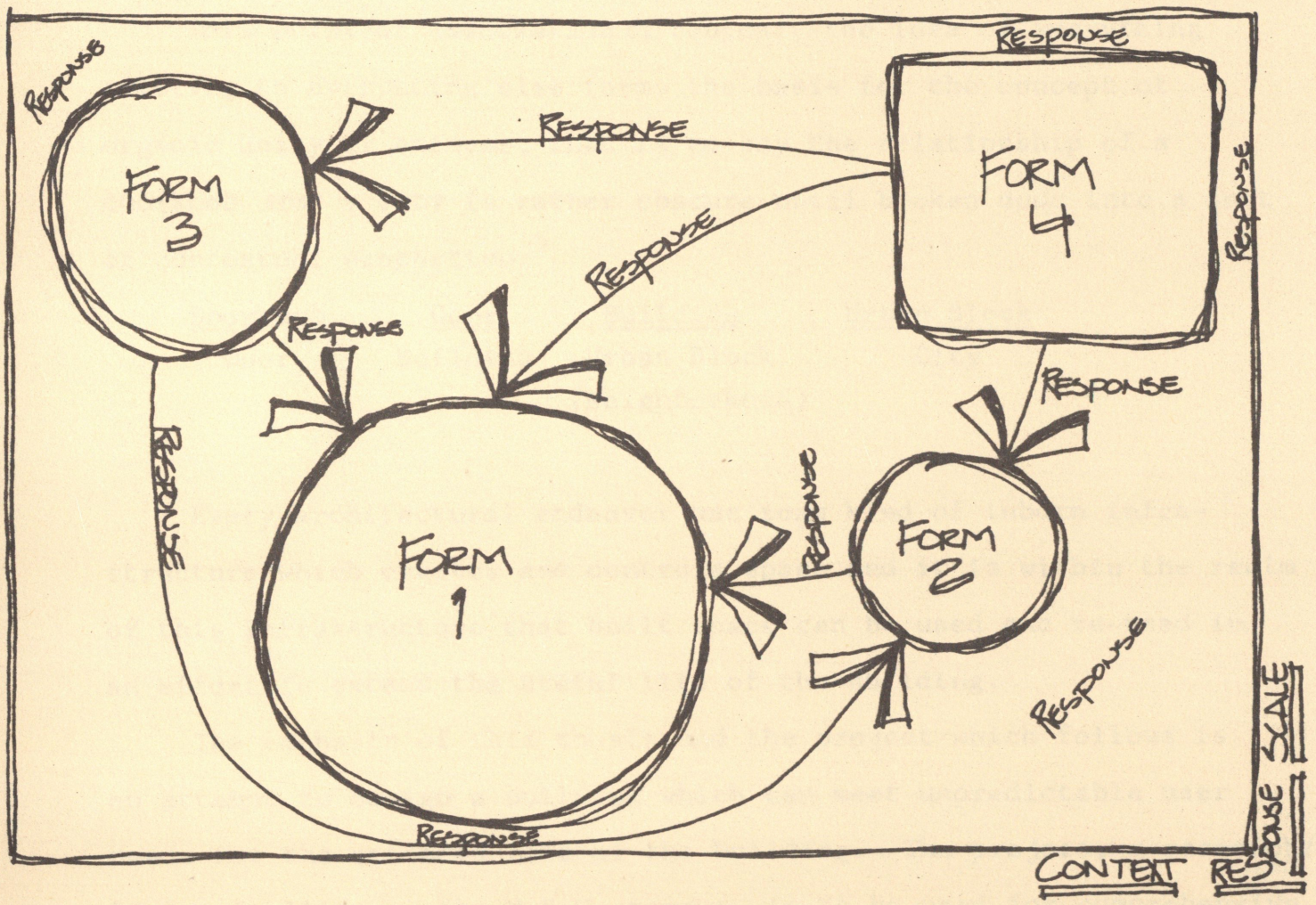

RESPONSE
RESPONSE
RESPONSE
RESPONSE
RESPONSE
RESPONSE
RESPONSE
RESPONSE
RESPONSE
RESPONSE
RESPONSE
FORM 3
FORM 4
FORM 1
FORM 2
CONTEXT
RESPONSE SCALE

Fig. 9

This point of association or context, the idea of everything relating to everything else forms the basis for the concept of organic unity or oneness, that is to say the relationship of a doorknob and a city is rather obscure until broken down into a sort of contextual proportion:[5]

Doorknob	Door	Building	Urban Block
Door	Building	Urban Block (Neighborhood)	City

Every architectural endeavor has some kind of inborn infrastructure which creates and controls space and it is within the realm of this infrastructure that built space can be used and re-used in an effort to extend the useful life of the building.

The emphasis of this thesis and the project which follows is an attempt to design a building which can meet unpredictable user needs for the extended life of the building. The project, a research/living facility on the M.S.U. campus, is to be used for comprehensive

study within a scholastic type of atmosphere and will encompass a broad spectrum of users, all of whom represent different sets of unknowns. It is my intent to try to design a building which can respond to these constantly changing needs but still retain its identity. By being bound in an infrastructure based on design elements which relate to the ideas of research, institution, scholars, knowledge and man.

ARCHITECTURE:
"THERE ARE NO DEFINITE ANSWERS, ONLY PERCEPTIONS OF POSSIBILITIES."

G. EXLINE

PART 3
TOWARDS A SOLUTION

Part 3 Towards a Solution

Architecture:

"There are no definite answers, only perceptions of possibilities."

G. Exline

Attitude

The development of an attitude about a problem is essential to its solution; one must understand the nature and background of the problem so that it can be approached in an analytical frame of mind. In order to design for research, one must understand some of the ideas which are inherent to all research. The ideas basic to research can be classified into two categories which I shall label a passive category and an active category.

The passive aspect of research is basic to all research; it is the beginning of the process, that point where ideas are born. This type of research requires more thinking than concocting and therefore demands a certain degree of solitude. The kind of solitude referred to here is not one of isolation but as Thomas Merton wrote, "The vocation of the person is to construct his own solitude as a condition, for a valid encounter with other persons, for intelligent cooperation, and for communion in love."[6] It is within the realm of this passive research that we find

creativity, that which is responsible for research. Creativity is a human product based somewhat in the emotions and is therefore affected by one's surroundings. The question then becomes: If one's creative spirit is affected by his surroundings, could it be enhanced by "good" architectural surroundings and if so, what are "good" architectural surroundings with respect to research.

The second category of ideas embodies active research, the actual scientific investigation in the laboratory. This situation is still deeply rooted in the spirit of creativity and is also affected by the architectural context although in a more fundamental way. It is here that we begin to see the need for flexibility and adaptability as the researcher requires a variety of settings in which to carry on his work.

The need for research centers stems from the realization that research is useful and perhaps even essential to the continued progress of an advanced industrial society. This is amplified by

the American Council on Education, in the following passage:

> " . . . The financial support of research cannot be considered adequately without feeling the importance of research in our national life. It has come to be a major means for furtherance of our national objectives and for the maintenance of the general welfare and the national safety. It has come to exert a great influence on our economy . . . Research has come to play a fundamental part in the maintenance of the public health. . . Similarly, research is essential to national defense . . . for these clearly evident reasons, it has become national policy to encourange and support research, and the growing conviction of the American people that research is essential to their welfare underlies the action of our government in making federal funds available on a scale that would have hardly been imagined a quarter of a century ago."[7]

Although this report came out in 1954, almost another quarter of a century has passed and it still applies almost as if it were written yesterday.

Research institutions on the college level seem to be driven by three major forces:

1. Societal need.
2. Motivation and committment of faculty members
3. Concurrence of University administrators
    --Institutional development
    --Institutional change

It is within the realm of these forces that the following attitude statements have risen. The following list is specific to the research/living facility which I am proposing in this thesis and will ultimately influence my design.

Attitude Statements

1. Numerous short term users from diverse backgrounds.
2. Strive for a balance between theory and practice in the learning situation.
3. Laboratory opportunities and life experiences.
4. Adaptability of the school to move beyond its perimeter.
5. Emphasis on serving educators with the advancement of research.
6. A building which can meet unpredictable user needs for an extended period of years.
7. Cater to programs that are not provided for in the existing schools at the University.
8. Provide a stage for interdiciplinary cohesion.
9. Capability for experimentation.
10. Need to achieve a strong sense of place to foster interaction.

Program

Goal Statements

Function

A research living facility, which is made up of research facilities and temporary living units, adaptable enough to serve a researcher or group of researchers in the comprehensive study of a problem.

Form

That a well balanced, effective program of research will accent communications among researchers in the study areas as well as communications between the professors and the student group.

Economy

Materials and finishes should be carefully considered for their effect upon minimizing maintenance costs .

Time

That the University population will continue to grow and that couses of study will continue to be added, the research facility must be flexible so as to accomodate change.

Program

Site

The site I have chosen for the facility is a rather isolated but accessible corner of the Montana State University campus. The site, being cut off from the main body of campus by the physical plant, affords the "out of the main stream" attitude which is very important to the creative spirit of research. Although being on the south east corner of the campus, there is within easy walking distance all of the departments and facilities of the University, including physical exercise and food services.

The following figures illustrate the site and its context.

(Fig. 10, 11, 12, 13, 14)

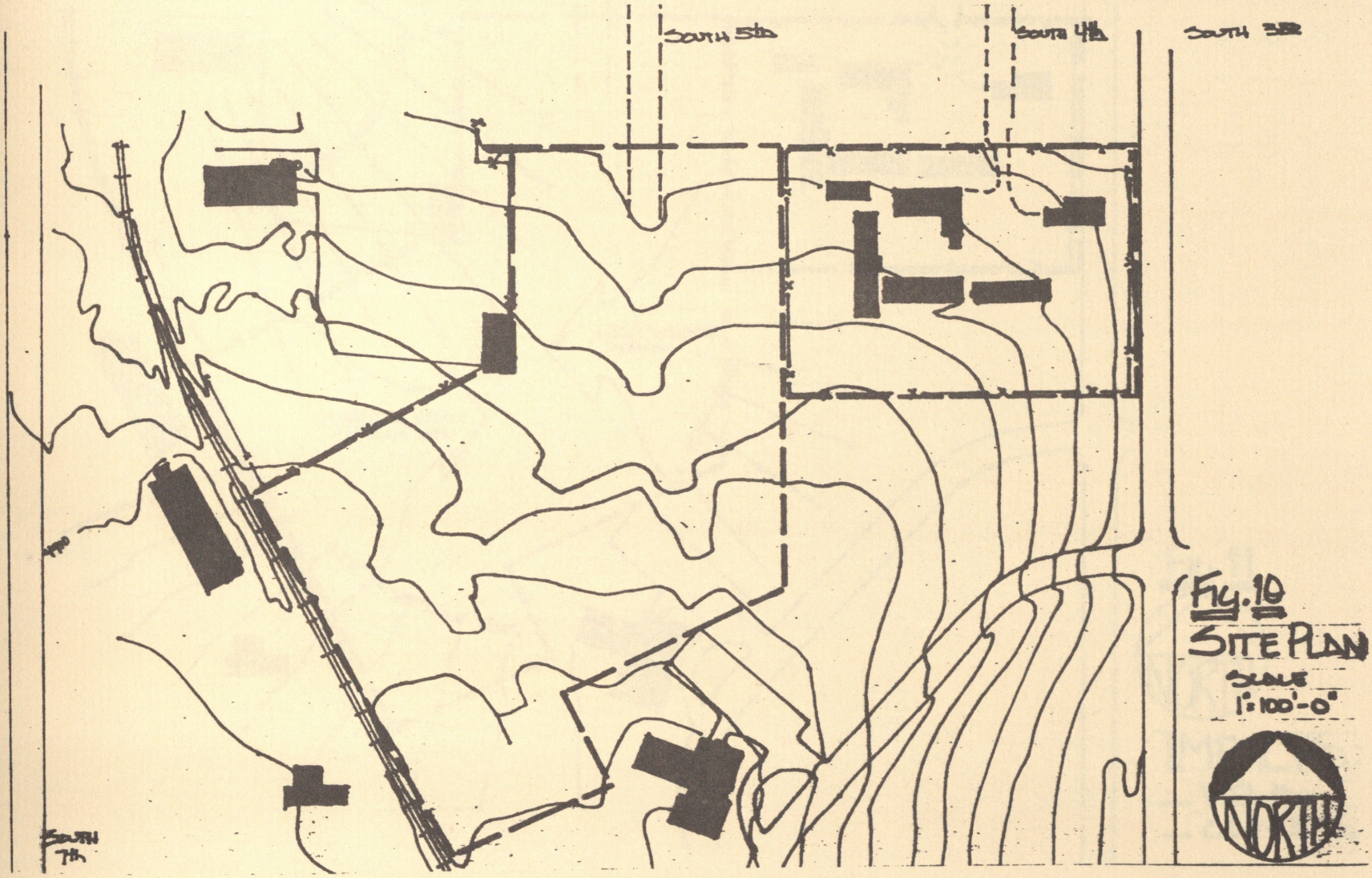


Fig. 10
SITE PLAN
SCALE
1"=100'-0"

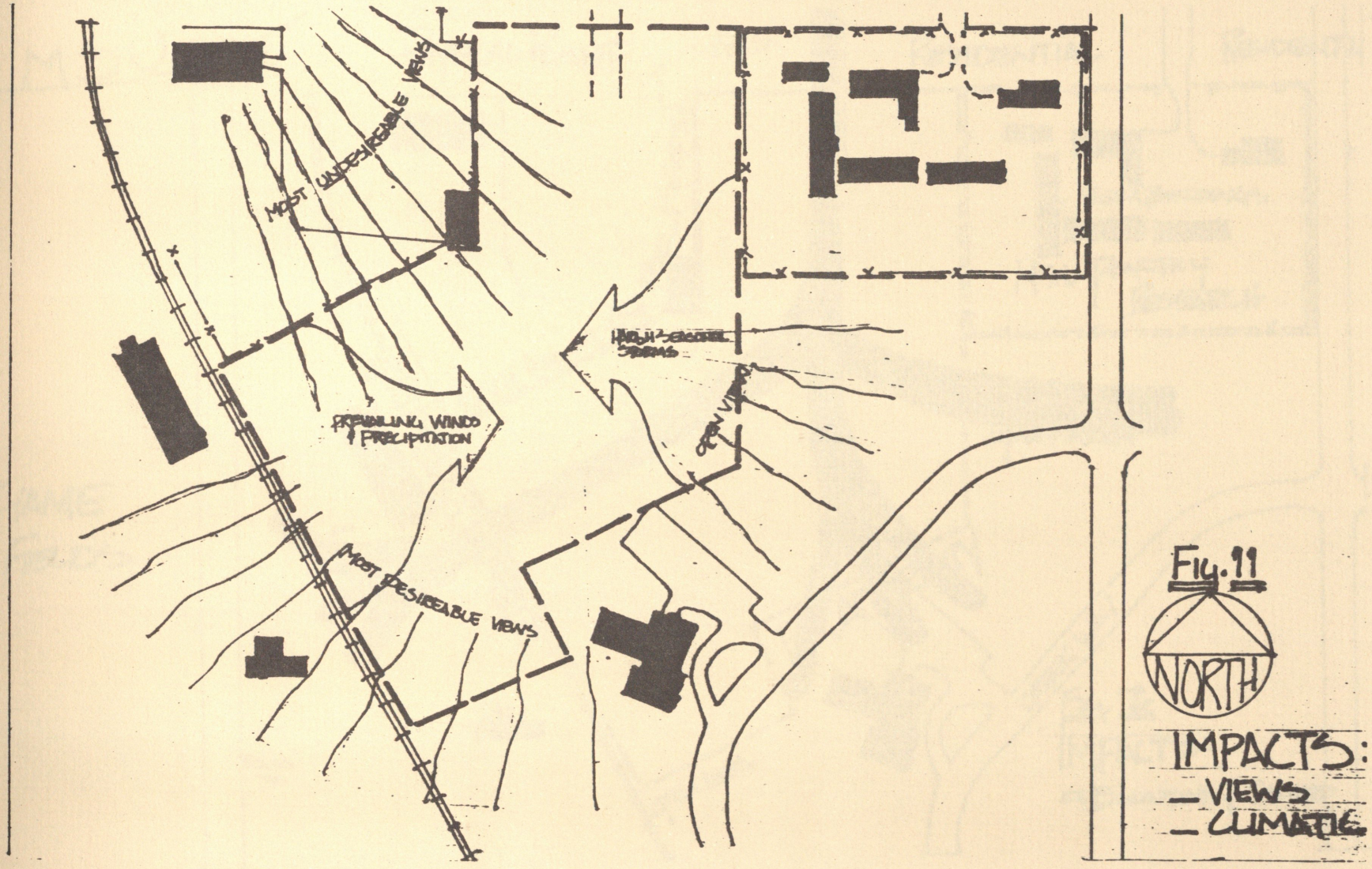

MOST UNDESIRABLE VIEWS
PREVAILING WIND & PRECIPITATION
MOST DESIRABLE VIEWS
NORTH
IMPACTS:
_VIEWS
_CLIMATIC

Fig. 11

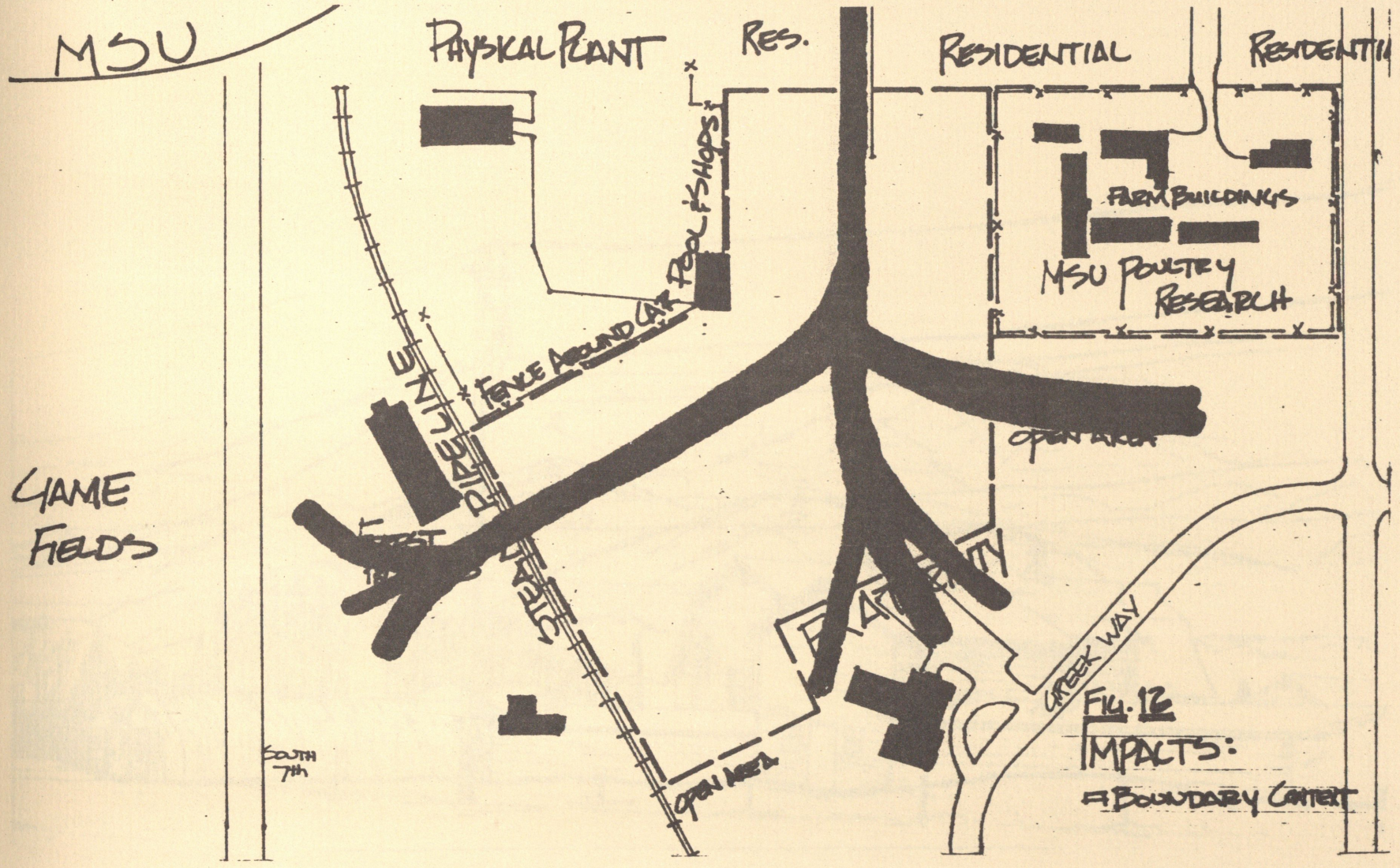
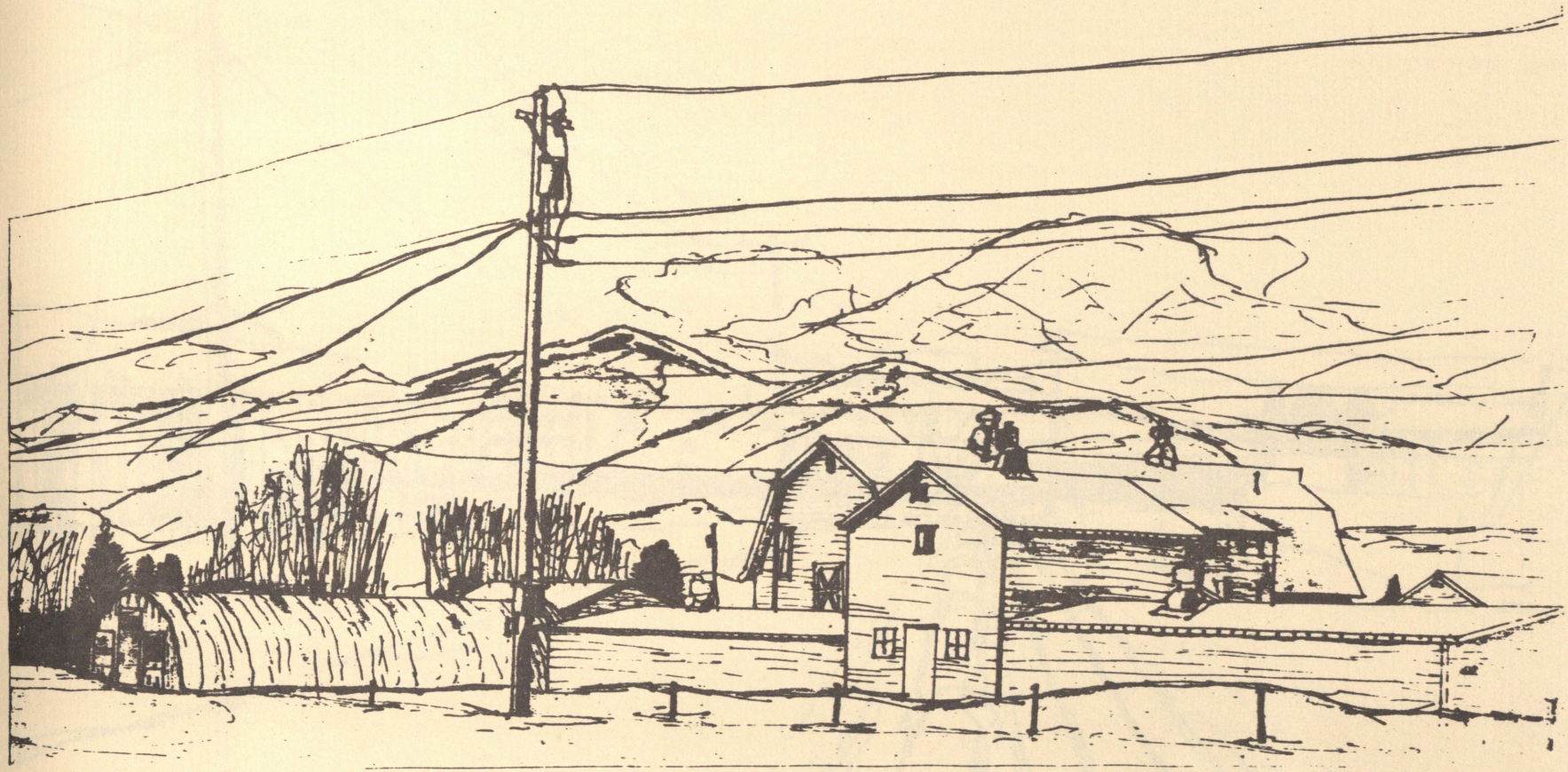


Fig. 12
IMPACTS:
= Boundary Context





PART 4
CONCEPTS

Part 4 Concepts

Before a strong concept can evolve I believe that there must be an idea as to what the nature of the problem is and which aspect is important to the overall design of the building. This is illustrated by Louis Kahn in the following statement about the Salk Institute. "Science, concerned with measurement recognizes the will of the living thing to be itself the great desire to express. The scientist needs the presence of the unmeasureable which is the realm of the artist."[8]

The controling attitude of my design is expressed in the following statements: Research is a process, the nature of which defines the justification of parts or particles. Individually or collectively, researchers represent particles which are contributing to a whole or what could be called knowledge. It is within this parts theory that I see the importance of the individual part or unit. I see the part more important than the whole until the

sum of the parts or the collective body of knowledge becomes that whole which is responsible for the generation of more parts.

(Fig. 15, 16, 17, 18, 19)

Fig. 15

CONCEPT

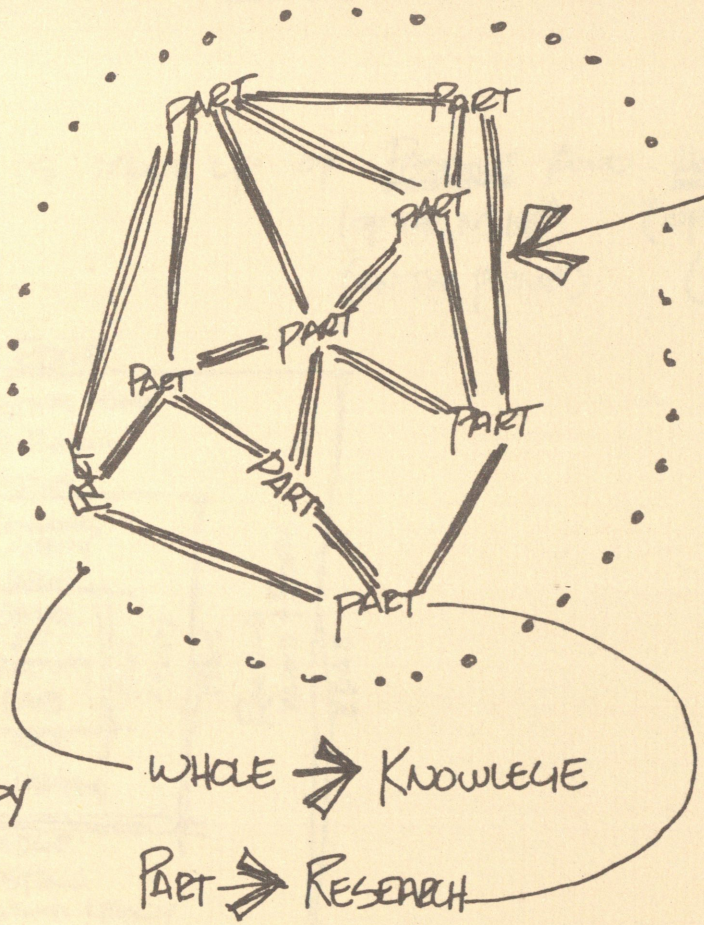
PART OR PARTICLE

— THAT ELEMENT WHICH IS RESPONSIBLE FOR THE EXPANSION OF THE WHOLE — THE FURTHERANCE OF KNOWLEDGE

— RESEARCH

- PASSIVE — OF THE MIND
- ACTIVE — OF THE ~~BODY~~
- RESEARCHER (HUMAN BEING) — OF THE BODY

— INNER STRUCTURE



STRUCTURAL BOND OR MATRIX

— THOSE HUMAN CONNECTIONS OR INTERDEPENDENCY TIES WHICH MAKE IT WORK

— INTERDISCIPLINARY COHESION

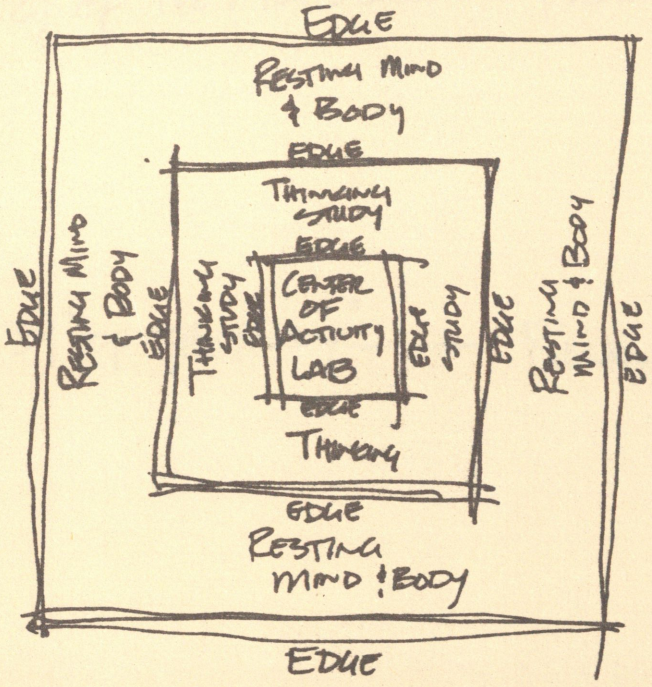
— OUTER STRUCTURE

.... THE SCIENCES, AND THE INTERACTION OF SCIENTISTS ARE VERY COMPLEX, AMAZINGLY PERSONAL, AND INTIMATE. THE SEQUENCING, OR FLOW AND CONFIGURATION OF SPACE SHOULD BE CONCEIVED SO AS TO REFLECT RATHER THAN REFUTE THIS INHERENT COMPLEXITY." ———

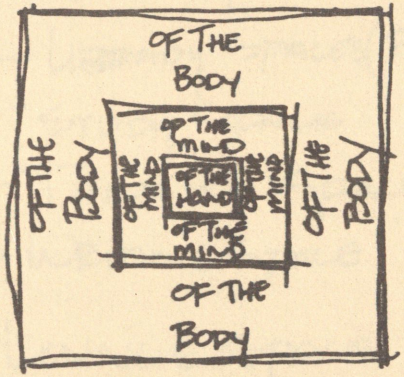
FIG. 96

PARTS THEORY

A PART IS MADE UP OF PASSIVE (OF THE MIND) (ON THE FRINGE) AND ACTIVE (OF THE HAND) (CENTRAL) RESEARCH BY A RESEARCHER (OF THE BODY) (HEMDAN CONN.)



INNER PARTICLES



INNER STRUCTURE

Fig. 19

Inner Structure

1) "of the Hand" — Active Research — Lab Space

2) "of the Mind" — Passive Research — Quiet Space
- Library Spaces (Resources)
- Study Space
- Thinking Space
- Writing Space

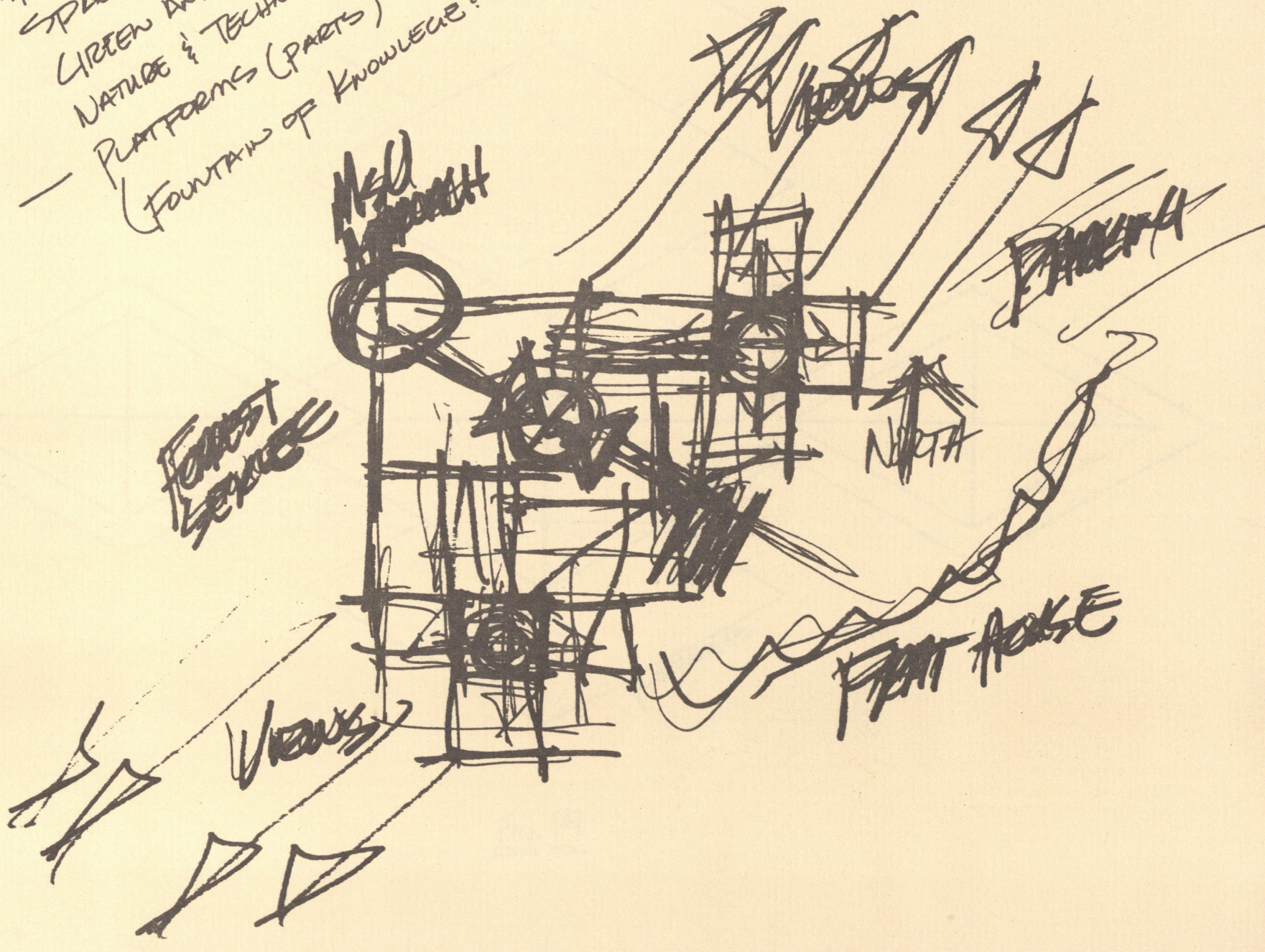
3) "of the Body" — Relaxation — Lounge Space
- Outside Space
- Sleeping Space
- Personal Space
- Collaborative Space
- Meeting Space

Outter Structure

1) "of the Whole" — Connections — Commons Space
- Outside-Inside
- Communications
- Circulation

Fig. 18

— HEIRARCHY OF SPACES (PARTS)
GREEN AND PAVED
NATURE & TECHNOLOGY
— PLATFORMS (PARTS)
(FOUNTAIN OF KNOWLEDGE??)



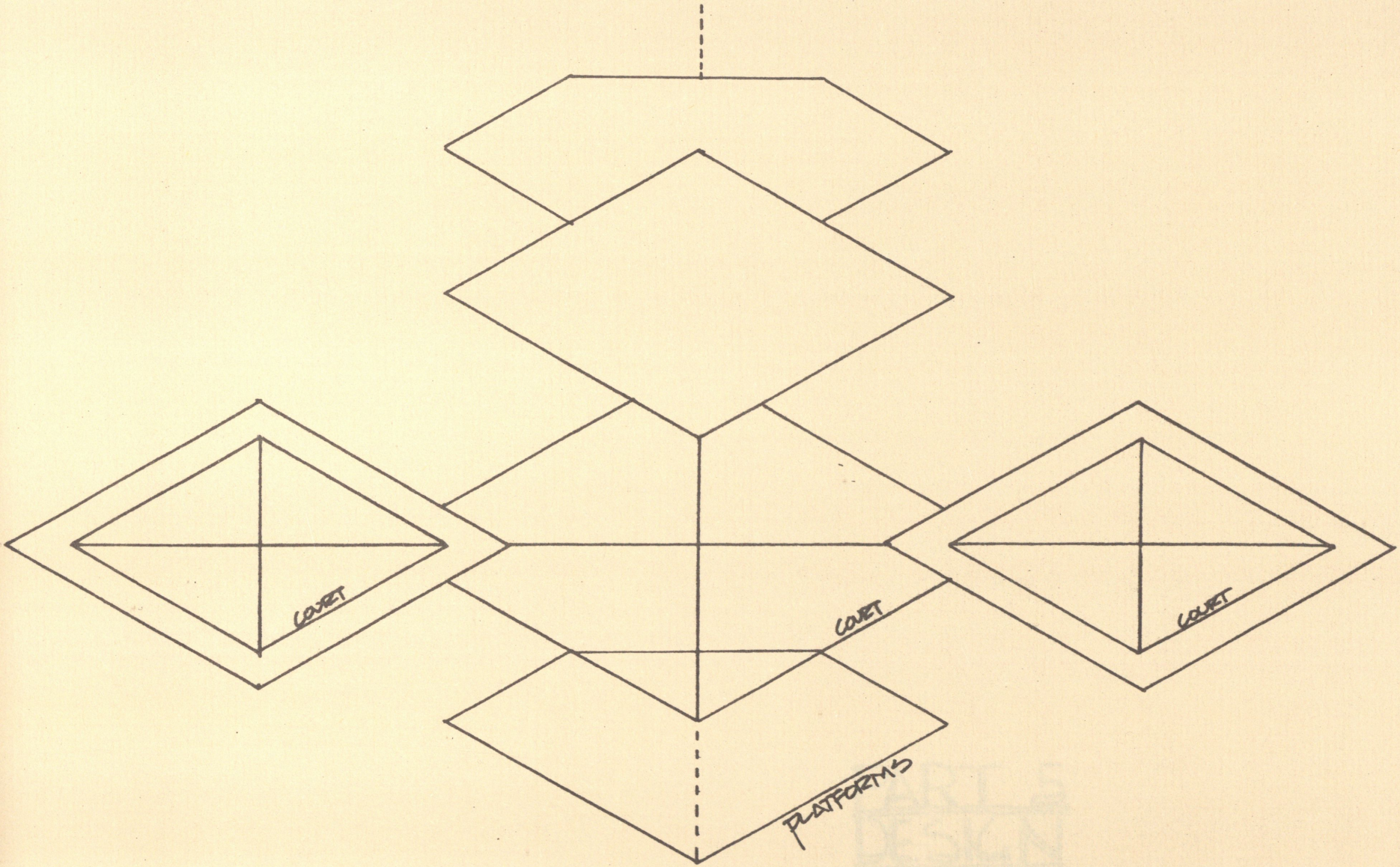


FIG. 19

PART 5
DESIGN

Part 5 Design and Conclusion

It was my intent in this project to deal with ideas basic to: Research, Institution, Scholars, Knowledge and Man. For this design, these became the parts and represented a complex association of elements to be accounted for in the building. This complexity of ideas needed to be bound into some kind of an infrastructure which would recognize both the parts as well as the whole and provide an overall identity for the building. I felt that the building should have a feeling of monumentality which called for a very straight forward simple arrangement of the parts which is why the plan is very strictly bound to symmetry and geometry. The geometric simplicity of the building or the whole allows for the complexity of the parts.

The design which has evolved is based on a hierarchy of platforms which are symbolic of nature and technology. These platforms take the shape of courts which become the underlying organizational element of the plan. The relationship of nature and technology is

amplified by the treatment of the specific courts and then using the element of circulation to expose the researcher to both nature and technology and to the setting of the mountains. The building affords the researcher varying degrees of solitude with the isolation of a private studio in the living unit buffered from interruption by heavily wooded courts which step up onto a terrace directly outside of the studio. The circulation of a researcher, from studio to specialized lab space, becomes a transfer of inside to outside to inside, switching the exposure of nature to building with reminders of the overall context of the project.

In concluding this text and this project, it is not possible to write out everything which I have learned but I feel that I can say it was a very good exercise for me and an excellent culmination of my schooling as well as preparation for working in the profession.

FOOTNOTES

FOOTNOTES

[1] Friedman, Yona. Towards A Scientific Architecture, (Cambridge Mass: The MIT Press, 1975), pp. 2-3.

[2] Alexander, Christopher. The Oregon Experiment, (Cambridge, Mass.: The MIT Press, 1968), p. 69.

[3] Caudill, William W. Architecture By Team, (New York: Van Nostrand Reinhold Company, 1971), p. 78.

[4] Pena, William, Caudill, William. Problem Seeking, (Houston, Texas: Cahners Books International, 1977), p. 51.

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THESIS:
THE INHERENT QUALITY OF TIMELESS ARCHITECTURE IS ACHIEVED ONLY WHEN THE IMMEDIATE NEEDS OF THE PRESENT USER ARE IN BALANCE WITH THE BASIC INBORN CHARACTERISTICS OF THE BUILDING.

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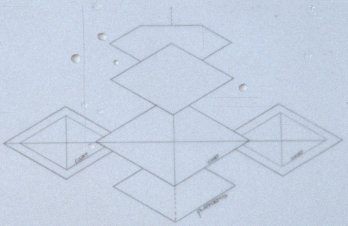
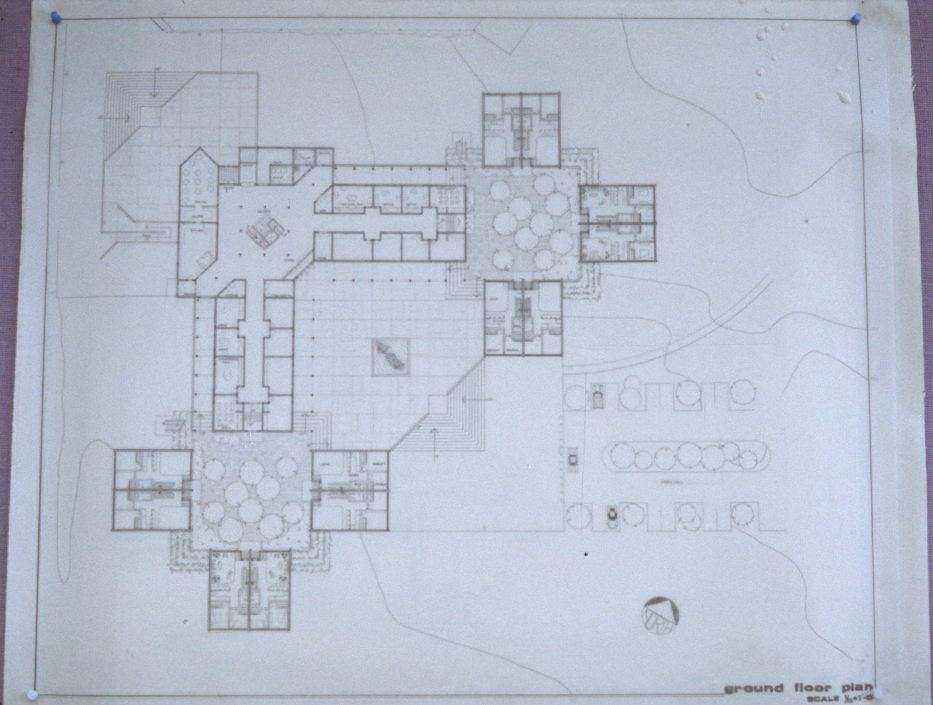


concept

june 7, 1978
ferrel sukut


ground floor plan
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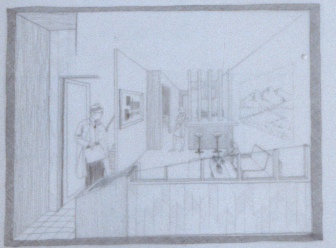

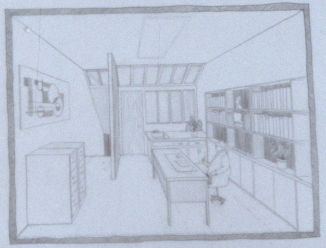

perspectives . elevations

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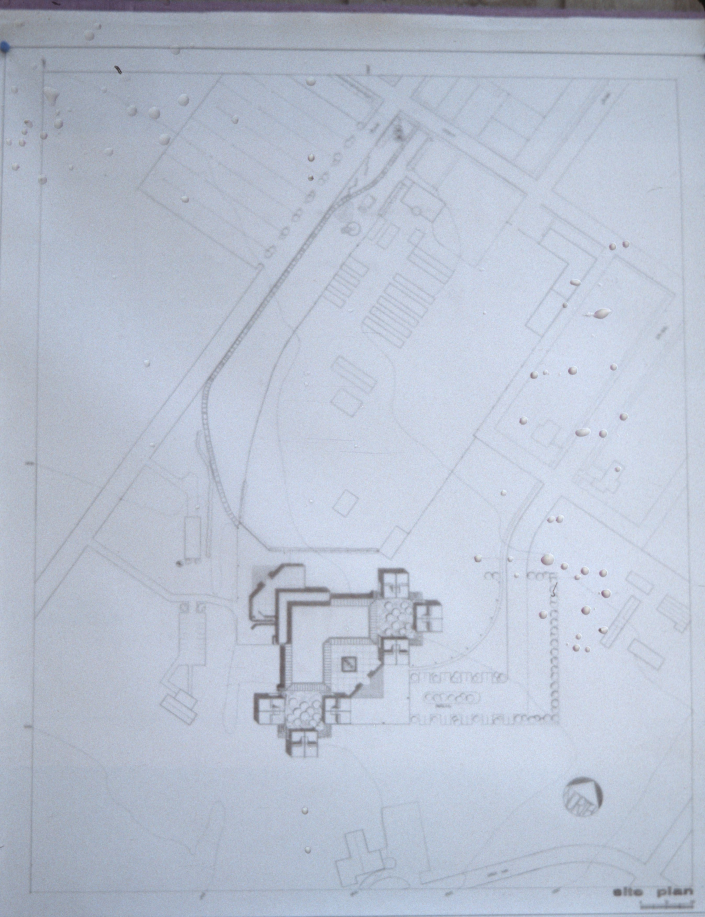
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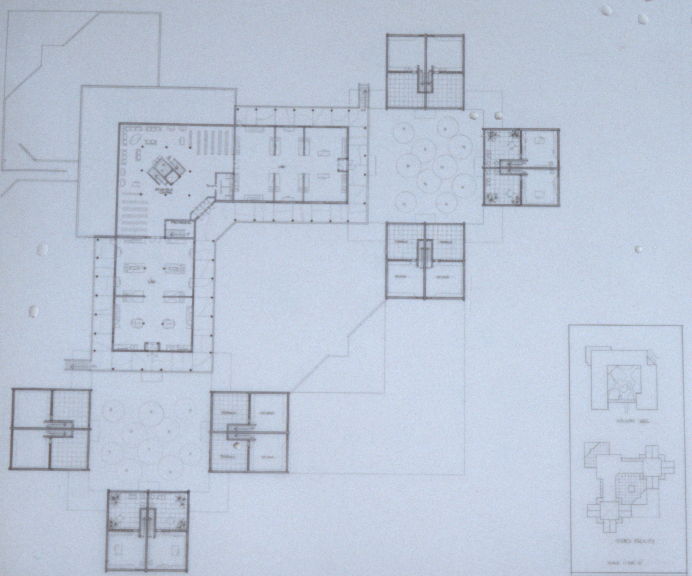

second floor plan

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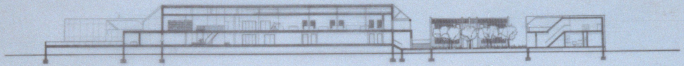
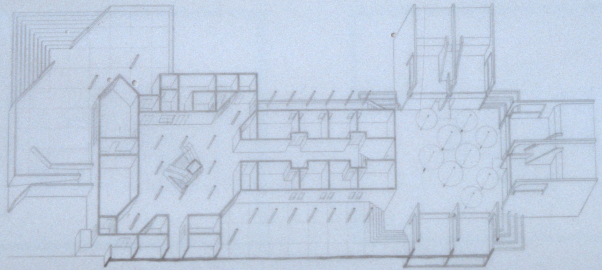
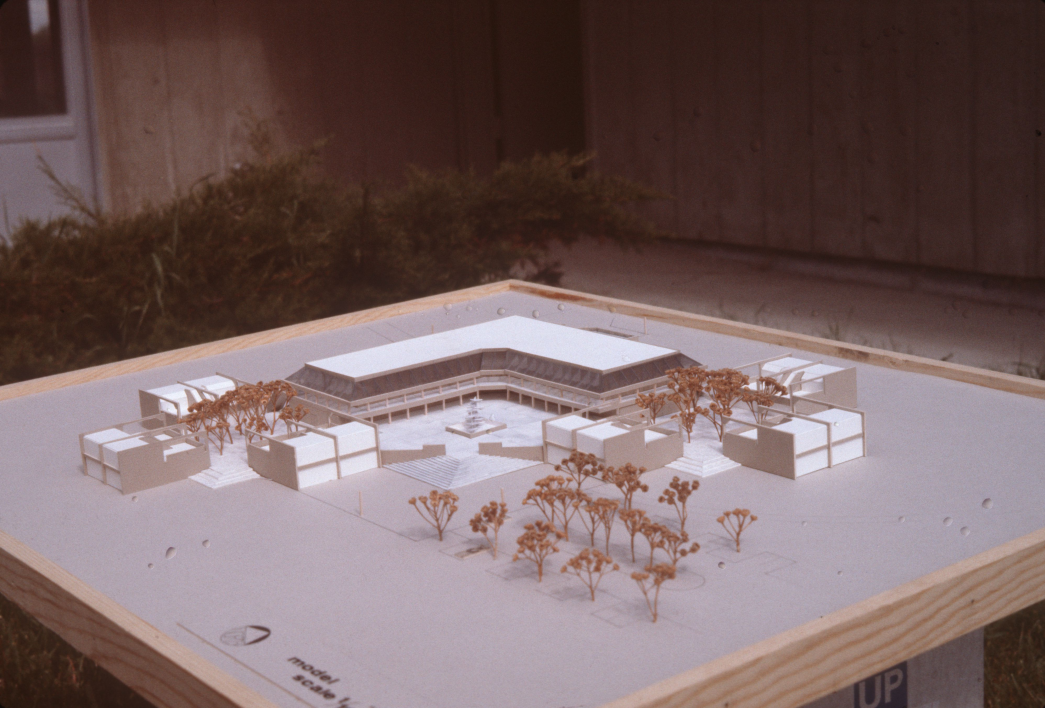
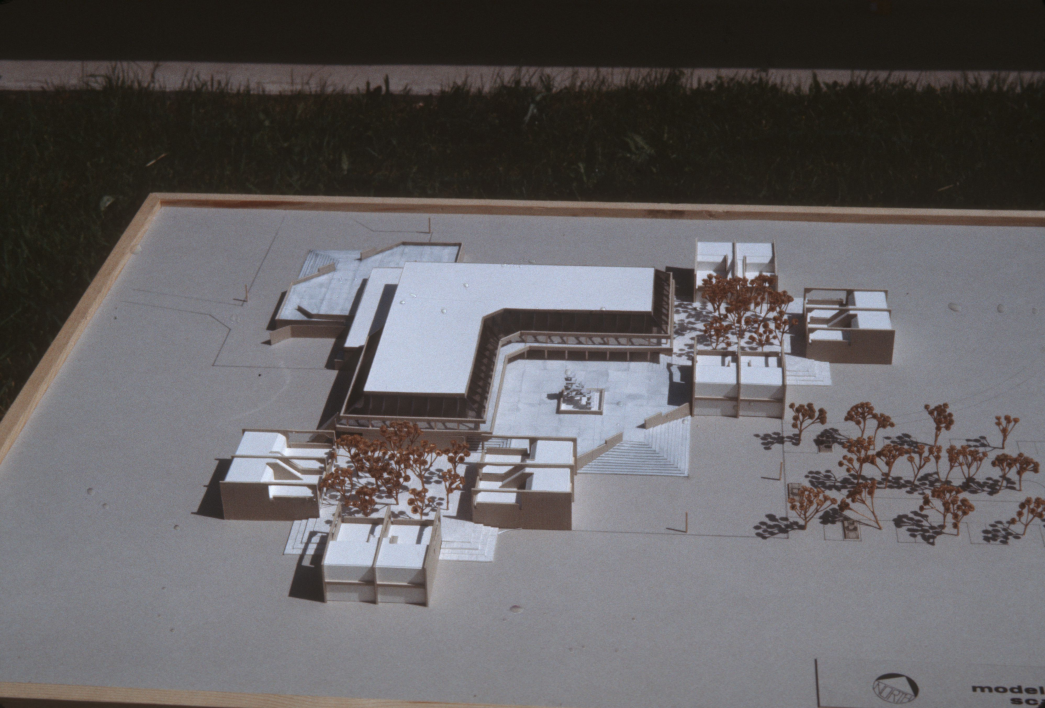




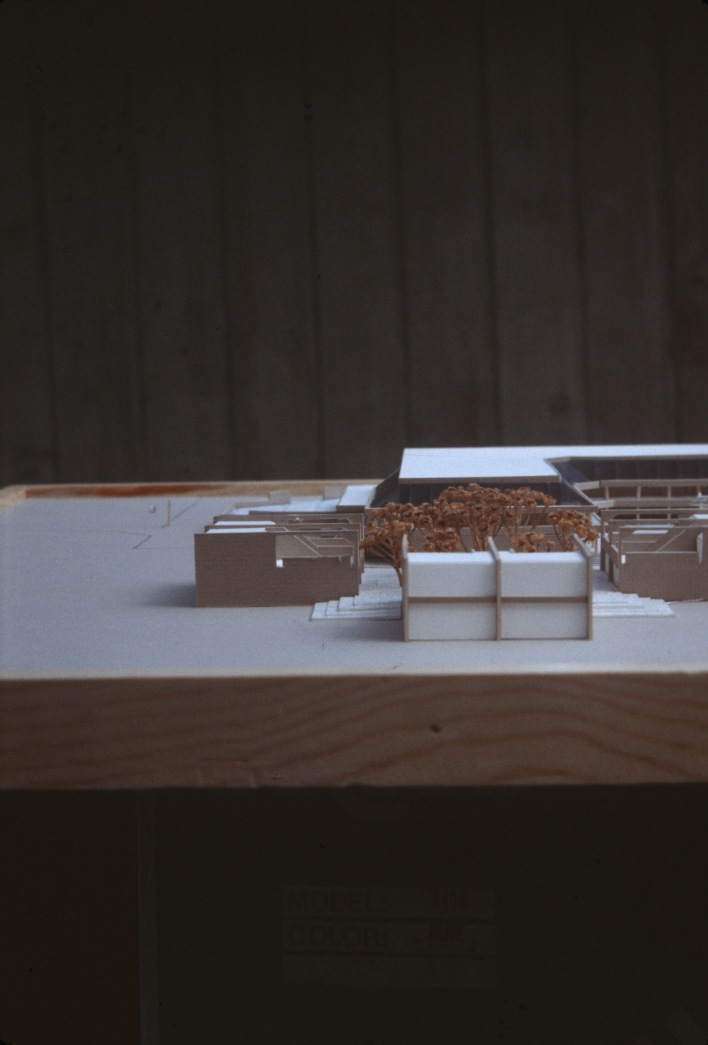
axonometric, sections

SCALE 1/8"-1'-0"


model
scale









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