

MARK GELERNTER
RATIONAL DESIGN:
TOWARD A HUMANISTIC ARCHITECTURE

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RATIONAL DESIGN: TOWARD A HUMANISTIC ARCHITECTURE

A Thesis

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the Faculty of the School of Architecture

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CHAPTER I

INTRODUCTION

If we understand a humane society to be one in which the well-being of each individual is of paramount importance, very few reasonable people would deny the value of such a society as a goal for human action. Although problems are inherent in this assertion, we will assume for reasons elucidated in the paper that, in principle at least, a humane society is a fundamental goal of most individuals within any culture. Although this goal is a professed value of architectural designers, this thesis will show that architects do not design humane environments, and in fact throughout history have more often than not contributed to the propagation of very inhumane environments. Since it will further be shown that inhumane environments are one and the same with inhumane cultures, this thesis will conclude that architects, by the very nature of the way in which they design the built environment, are actually prohibiting the realization of a humane society.

In order to remove this most distasteful incongruency between the professed values of the designers and the reality of their actions, this thesis will examine the nature of a humane society and the relationship of the built environment to the realization of such a society in an attempt to determine the true goal of the design activity. Once this goal has been established, this thesis will then discuss the principles of the design activity needed to assure the achievement

of the goal. In short, this thesis will examine the theoretical foundations of a rational design process used to help develop a truly humane built environment in a truly humane society.

As a test of this theoretical process, a building has been designed using these principles. The design information and slides of the finished design will be found in the appendix. On the basis of an evaluation of this design, this thesis will conclude that humanistic buildings can be designed by rational methods without sacrificing the visual values held in so much esteem by designers.

CHAPTER II

IN THE NAME OF HUMANITY

The introduction of this thesis suggested that a definition of a humane society would be any society which held the well-being of each individual within the society to be of paramount importance. If we are to examine this notion in detail a more exact description of "well-being" is necessary.

Well-being; The Satisfaction of Biological Needs

Any definition of well-being can ultimately be reduced to one of mental and physical health. Dignity, for example, might be a well-being requisite, but if dignity is viewed in a more general context, we should conclude that the individual requires dignity to assure mental health. So a better understanding of the functions of health will give us an insight into individual well-being and hence into the nature of a humane society.

A great deal of work has been done in physiology and psychology to understand the functions of the human organism, but according to Abraham Maslow¹, many of these studies emphasize abnormalities and sicknesses. In order to change this emphasis, Maslow and others formed the humanistic school of psychology. This group has attempted to define human behavior in terms of health. Drawing from empirical research and clinical studies of healthy individuals, the humanistic psychologists

have developed a theory of motivation and behavior which tells us a great deal about the nature of health in human beings.

Biological needs. According to these psychologists, we are all born with certain biological characteristics which are subsequently developed and refined by our interaction with the environment. These characteristics consist of (1) a set of needs which are species-wide, and (2) a set of individual potential limits on the skills each individual might develop in life with which to satisfy his needs. These two characteristics will be discussed in turn.

The species-wide needs, according to Maslow, are arranged in a hierarchical order. All our motivation can be described as action taken to satisfy any unfulfilled or frustrated needs. And since unfulfilled needs ultimately lead to sickness, the self-preservation instinct of man always forces him to find satisfaction of his needs. We begin at the lowest level in the hierarchy and once these needs are relatively well satisfied we move to the satisfaction of the needs at the next level. The lowest, most fundamental needs are the physiological needs, including hunger, thirst, sex, the homeostatic mechanisms maintaining optimal levels of salt, sugar, temperature and oxygen, as well as sleep, relaxation and bodily integrity. Once these are satisfied the individual becomes concerned with the safety needs. These secure an orderly and predictable world, both physically and psychologically. Next on the

scale are the love and belongingness needs or relationships with other people. The fourth level seeks the satisfaction of esteem needs, the desire for achievement and competence. The last level, the most sought after in many respects, is the need for self-actualization, or the full use and exploitation of talents, capabilities and potentialities. This has also been called the level of the aesthetic. Motivation, then, can be described as the process in which an unfulfilled need creates an impulse within us to take action to fulfill the need. And according to Maslow, the individual directs most of his actions toward unfulfilled needs.

Although an individual is motivated to satisfy his needs, the specific actions taken are restricted by the biological limitations on the potential skills of the individual. An individual with an uncoordinated, small body may have a great unfulfilled need for esteem, but he cannot satisfy that need by becoming a professional football star, no matter how hard he tries. On the other hand, while we all have extreme biological limits on the potential skills with which we satisfy our needs, very often these skills are not developed to their fullest potential. If skills are not developed to their fullest potential, the ability to satisfy needs becomes greatly compromised. So a lack of skills will lead to sickness. But skills are not the only factors which influence the satiation of needs. In actuality, skills are used to change the environment surrounding the individual because

the environment drastically affects the satisfaction of needs. The football star developed his skills so that he could influence the social environment around him. By acquiring skills held in esteem by a society which controls his emotional, social, and economic well-being, he is able in a large part to manipulate the satisfaction of his needs, and assure his health. But often the individual's skills are not sufficient to change the environment, or outside forces thwart his change attempts. When this occurs the environment does not respond to the individual's wishes and his needs go unsatisfied. To avoid this dilemma, we must understand the relationship between skills and the environment; this relationship is found in our cultural institutions.

Cultural institutions. According to most anthropologists, every action we take is controlled by one cultural institution or another.² When an individual is motivated to satisfy an unfulfilled need, he does not take arbitrary action; his culture sets up limits of appropriate actions which will be accepted by the other members of the culture. Everyone has a hunger drive, but our American culture tells us to go to a restaurant or supermarket instead of indiscriminately shooting a cow. Actions taken to satisfy needs are mediated only through cultural institutions; if the proper institution malfunctions or does not exist, the needs related to that institution will not be satisfied. Since the individual directs most of his attention to frustrated needs, a culture which does not provide a satisfactory outlet for some needs

will change the direction of the individual's actions and consequently not allow him to reach his full potential in other areas. This, then, is why our skills are often not developed to their fullest potential.

Earlier, it was pointed out that our biological characteristics are developed and refined by the environment. The full implication of this now becomes clear; while the set of needs are the same for every human, the forces of a culture cause each individual within that culture to have a unique make-up of those needs. This unique make-up varies -- within the framework of the species-wide need set -- with time, age, social status, and the culture.

The culture also provides us with the "tools" and the systems necessary to maintain and participate in the cultural institutions -- the food production chain which supplies the supermarket, for example. This includes the tools and techniques of farming, distribution, and marketing, as well as the social, political and economic systems which organize the people involved in the food production chain.

One of the major tools used in the operation of cultural institutions is the built environment, including architecture. The food chain, to follow our example, requires physical forms such as food storage facilities, shelter for the farmers, organized meeting places for the political system, display shelves for the marketing system and food preparation facilities for the cooks at home. Architecture, then,

is part of the physical form required in the function of cultural institutions used to satisfy human needs.

In order to consolidate and clarify this cultural framework the three functions of culture will be listed:

1. The culture as a need determiner. Within the limits of the species-wide need set, the culture helps shape the specific, individual make-up of those needs.
2. The culture as a mediator. The actions taken to gain satiation of an unfulfilled need are mediated through cultural institutions. The institution sets down acceptable limits and general guidelines of proper actions. See figure 1.
3. The culture as a tool provider. Once the acceptable activities are outlined, the culture provides the tools necessary to carry out those activities -- physical forms, economic and political systems, etc.

In order to tie together the relationships among biological needs, cultural institutions and cultural tools (including buildings), let us follow a simple example. The members of a Latin culture have a need for affiliation, as do all humans, but due to certain forces within their culture, their need is very emphasized. The actions taken to satisfy this need are channelled through many institutions, one of which is the evening stroll. In order to allow the institution to function, the culture provides broad walkways, town squares, and evening gathering

places where the individuals of the culture can satisfy their affiliation needs.

The Distopian State of Affairs

This should give us a much better understanding of an ideal, humane society. Ideally, each individual in the society would be surrounded by a sympathetic biological environment and all the proper institutions and tools needed to allow him to satisfy all his biological needs. Every individual would be healthy and the humane society would flourish. We clearly haven't achieved this goal in our social, economic, and political systems, and this thesis will not dwell on a self-evident issue. But despite the rosy images in many architects' minds, we have not achieved this in the built environment, either. Since architecture is an extremely important cultural tool used to satisfy unfulfilled needs, the designer should share the blame for our distopian state. The buildings derived from the design activity as it is performed in our society today reveals a very inhumane set of values. Our architecture is clearly not designed for use by human beings, nor as a tool used to achieve a state of health for those who try to use the structures. Most buildings in their final form ignore many functional considerations in order to heighten the one aspect thought by the architect to be most important. It is this rejection of the concept of satisfying all the users' needs in a building that leads to sickness and hence

inhumaneness for everyone involved. For example, the Federal Reserve Bank in Minneapolis stresses an elegant structure at the expense of a socially useful plaza and ignores the adverse impact of the building shape and materials upon energy consumption. Robert Venturi's buildings blow the symbolic function of architecture so out of proportion in comparison to other functions that clients end up with a sewer pipe running vertically through a conversation area and a picture window in the exterior wall next to the toilet. Le Corbusier's visually beautiful "pilotis" cause the wind under Unité d'Habitation to increase in velocity and throw children against the concrete pillars. Obviously, none of these architects thought they were designing in a non-humanistic manner, but the full implication of their design decisions is that all the people using their buildings cannot be assured of achieving well-being. In fact, the nature of the design prevents the achievement of well-being -- i.e., a humanistic existence.

Although many problems are responsible for this current state of affairs, several of the most important ones will be examined in depth in this thesis; if we are ever to achieve a humanistic built environment, we must know the enemy. The first problem to be discussed is the difficulties which arise when individuals interact with other members of the society. The second one is that of rapidly changing cultures in a technological civilization, and the final problem is the grossly irresponsible way in which designers evaluate the built environment.

On liberty and tolerance. The ideal is to achieve well-being for every individual in the society. Unfortunately, what is good for one person is not necessarily good for another. How can the well-being of the murderer be supported without violating the well-being of his victim? We cannot appeal to John Stuart Mill's³ argument that the individual should be able to commit any acts which do not infringe upon the welfare of others, because any acts committed by an individual will affect other individuals in some way. The limits of acceptable activity cannot be defined by democratic vote, unless we are willing to accept the unreasonable limits imposed upon the minority by what Mill called the tyranny of the majority. Likewise, the concept of the greatest happiness for the greatest number of people runs into problems of value -- is a great amount of happiness for a small group of people more satisfactory than a small amount of happiness for a great number of people?

Philosophical ethical theory has found it very difficult to resolve these problems in the concept of well-being for everyone. Yet no one wants to dump the entire concept because of this. This concept is the very foundation of western civilization, but the wide differences in the ways in which these problems are dealt with in the various countries' cultures points out the profound impact the difficulties have on the health of each individual.

Cultural changes. We have understood so far the relationship between a satisfied need and an existing, satisfactory cultural institution. But what happens, as was suggested earlier, if a need cannot find an outlet due either to a malfunctioning or non-existent institution? Unfortunately, this is the rule rather than the exception. Due to many complex conditions, including technological changes, social evolution, and confrontations with other cultures, our culture is in constant flux. When the culture changes, many needs are no longer fulfilled; since before the change the culture and the needs had reached a state of equilibrium, any change in the culture will upset this balance and leave some needs unfulfilled. As soon as some needs are not satisfied, the individuals of that culture direct their attention to actions which they think will fulfill those needs. These exploratory actions take the form of experimental institutions; many new institutions are tried in the hope that one will ultimately renew the fulfillment of the needs. Examples of these experimental institutions today are the counter-culture mores, alternative life-styles, and the various experiments with marriage, work and education, etc. This entire process is very similar to biological evolution. Just as nature experiments with different mutations to find the ones best suited to a particular location, in the days before the Industrial Revolution nature would select the successful institution and reject the unsuccessful. When a new successful institution is found, the society eventually adopts it, and the physical

form of the community eventually reflects the new institution. Historically, this successful adaptation of architecture to the culture can be seen in such forms as teepees, igloos, etc.⁴

Today, due to the Industrial Revolution, our culture is changing so rapidly that the proper institutions can no longer be selected by natural processes. We are experimenting with new cultural institutions, but the cultural changes come too quickly to allow nature to test the fitness of these institutions. From figure 2 we may see that the congruency between our biological needs and the institutions of our culture has suffered severely since the Industrial Revolution. Until a way is found to cope with these changes our needs cannot be satisfied.

The morality of evaluation. Architects, as do most other professionals, neglect the moral aspect of their activity. Prisons have extremely complex moral issues inherent in their very existence, yet the society's special interests have always found expression through an architect. How many architects are around to protect the interests of the pedestrian in the sunless, windy canyons of New York or San Francisco? Some of these shady moral acts are understandable (although not condonable) because often the forces which encourage such action are outside the control of the designer. In this sense, the designer is a pawn of the society. (In every other part of our culture, however, individuals are held responsible for their actions despite the commands of higher authorities -- witness the Nurembourg trials, the Watergate conspirators, etc.) But what about that part of the design activity which is supposedly

the special realm and area of expertise for the architectural profession, the evaluation of buildings? Here no claims of external influence can be made; the responsibility is solely that of the architects. And while most architects would not view their activity as irresponsible, almost without exception, they point with pride and admiration to immoral projects in the history of their profession. This is because historically architects have separated the function of the building from its formalistic (visual) image. It was then possible to evaluate the image of the building without being influenced by its use. The view expressed by Violet-le-Duc is a foundation stone of both the academic history of architecture and contemporary evaluative criteria:

Little does it matter if a grille has closed a chamber of torture if the grille be well designed, and the iron well forged.⁵

The palace and grounds at Versailles are considered to be masterpieces in the history of architecture, but the "humaneness" would certainly be challenged by the peasants who lived in abject poverty in order to pay for the extravagance of the palace. We may dismiss the architect of the Louvre's torture chambers from the moral responsibility of supporting inhumane social values, and argue the merits of the building on purely formalistic grounds, yet we condemn the man who wielded the axe. Was not the designer, by his capitulation to the immoral forces, guiding that axe we so condemn? The humanistic value

of the building cannot be separated from the social situation of the building's use. As Tony Ward⁶ so well explains, the nature of the building determines the nature of the culture, and the nature of the culture determines the nature of the building. Hitler's architect, Speer, designed Nazi government buildings under the influence of totalitarianistic values, but had his buildings been used, they would have reinforced those values in the buildings' users.⁷ Architecture cannot be evaluated outside the context of the culture. To do so is to deny the very nature of the design activity. The architects by their gross misinterpretation of history have contributed to an attitude in contemporary society which dismisses the value of human need satisfaction.

CHAPTER III

RATIONAL DESIGN

In the previous chapter we determined that a humanistic society would be one in which the physiological and psychological needs of every individual would be satisfied; furthermore, that these needs are satisfied through the function of cultural institutions and their co-existent cultural "tools." But from evidence obvious to all, our society has not achieved this state. While this is due to many complex problems, we discussed three of the most major ones in an attempt to understand the nature of our distopia.

The essence of the problem is fundamentally twofold: first, while the interests of each individual are of primary concern, often the interests of many individuals are in mutual conflict. These conflicts must be resolved in such a way that the interests of all concerned can be optimized as much as possible. Secondly, the historic equilibrium between human needs and the cultural institutions has been so disrupted by rapid changes generated in the Industrial Revolution that natural adaptive mechanisms can no longer assure the satisfaction of our needs. This equilibrium must somehow be re-established.

In both cases, the forces which used to determine solutions are no longer viable. The conflicts in interests used to be resolved by physical force -- those with the economic and political power resolved the conflicts to their own best end. This type of solution is no longer

acceptable in a democratic society. The fit between human needs and cultural institutions used to be guaranteed by natural selection, but now this process is unable to adjust to a rapidly changing society. Humanism in a twentieth-century democratic technological society must be achieved by the rational control of man.

Man controls his own destiny. The natural or subconscious controls are no longer usable. Rational means must be found to evaluate the goals of society and to assure the achievement of those goals. In terms of figure 2 we must determine the exact make-up of the biological needs line and then reduce the incongruency shown between the biological needs and the cultural institutions. In short, we must rationally design our destiny. According to Robert Sommer:

Good design becomes a meaningless tautology if we consider that man will be reshaped to fit whatever environment he creates. The long-range question is not so much what sort of environment we want, but what sort of man we want.⁸

From this discussion, we can see that this proposed design activity consists of two parts -- the determination of the goal (what type of social system will allow the resolution of interest conflicts) and the means to that goal (what types of cultural institutions and tools will assure the achievement of that goal). Each of these will be discussed in turn.

The Goal: Optimized Individual Interests Within a Society

It should be obvious from previous discussion that until a way is found to optimize the need satiation of each individual within a society without subverting the same satiation optimization for the other society members, we shall not be able to develop a truly humane society. And consequently, we shall not be able to build humane architecture. To argue the contrary (that the humaneness of architecture is independent of the society) is analagous to arguing that the guillotine was a humane instrument; both architecture in an inhumane social system and the guillotine are instruments used to reinforce the values of the group of people in power. In the case of the guillotine, the politicians held the power. In the case of the architecture, the corporations, real estate agents, bankers, and architects hold this power to impose values upon others.

How can this usurpation of power be avoided? Clearly the actions of each person within a society must be limited, at least to protect the interests of everyone, and if a society is to function everyone must agree to them. The individual agrees to the limitation "do not cheat others" if only because he has a certain assurance that if he agrees to it he will not be cheated by others. Often, however, the actions of some people must be limited severely for the best interests of the society, which are ultimately the best interests of each individual (except the ones whose actions are severely limited). The corrupt

slumlord, for example, should not be able to constantly cheat tenants. His freedom to limit the freedom of others should be limited. On the other hand, unreasonable restrictions should not be placed upon actions which do not excessively harm others.

The rules by which we impose limitations are not clearly delineated, and the resolution of this problem does not seem readily apparent. Political philosophers have wrestled with these problems since before Confucius and Socrates, without much success. Until some breakthrough is made in ethical and political theory, for pragmatic reasons we must follow in the tradition of democratic politics -- control of power usurpation by checks and balances. The real estate agent will not impose racial segregation policies upon the sale of land if he stands to lose social status or economic position by doing so. And conversely, if an individual does not wish to have unreasonable limitations placed upon himself, he must have recourse to some type of power which will represent his interests. Consumer groups, economic boycotts, suffrage, and peer pressure are all types of power.

These problems also occur in the design activity. The interests represented in our built environment are very lopsided and support the values of corporations, developers, etc., to the detriment of those who use the building. As a way of minimizing this discrimination, Horst Rittel⁹ has proposed a design methodology in which all the people who will be affected by a future design participate in the design process.

The best way to have a person's interests expressed, the reasoning goes, is to have that person participate in the decisions which affect those interests. While there are many problems involved in this idea¹⁰, the intent behind it is well-meaning and more humane in many respects than our traditional approach.

Until we know much more about human behavior in groups, and until we develop a fair, humane political theory, our description of a humane society must be in terms of a checks and balance process rather than in terms of utopian conditions. Although such a description has not been developed for architecture (as it has been for politics) we will assume that it can be done, and proceed from here. From the process discussed above, we should be able to determine the most general goal of any design problem. For example, if we were to design an research facility, we would, through discussions with the facility staff, people in the surrounding area, etc., be able to determine that the way to achieve need satiation in the form favored by researchers would be to optimize the knowledge gaining activity. From this most general goal we can objectively generate all the functions of the research facility. This process will be discussed below.

The Means to the Goal: Prediction

Once we know what the most general goal of the design problem is, we must determine the design elements which will assure the

realization of that goal. Traditionally, this has been considered to be an aesthetic or value-laden activity. Yet, in principle, it is not.

Question of value or of fact? If we examine the role of values in the design activity, we must conclude that value decisions are in principle objective decisions with insufficient information. Values are rules used by the designer to make decisions. They are the criterion against which he tests the elements of a design. Value judgements, then, are decisions about the closeness of fit between an element or relationship of elements and the normative standards -- values -- of the designer. A good or valuable design element is one which closely satisfies the standards. See figure 3. But notice once the standard is established, the activity of determining the fit of an element is empirically objective and non-value laden, at least in principle. Either the element satisfies the normative standard, or it doesn't.

The element is also a means to the satisfaction of a goal -- in other words, the externalization of a value. A value is meaningless in design if it does not have a corresponding physical form; the value would not affect anyone in any way. Once the normative standard is set, the goal the designer strives for is the development of physical elements which satisfy the requirements of the standard and hence give the standard physical meaning. The element is the means to the physical realization of the value. See figure 4.

With a definite normative standard established, every judgement about elements related to that standard becomes empirically objective, and the value problem disappears. However, a value problem still exists with the normative standard. But from figure 4 we notice that the normative standard has a corresponding physical form, which in fact is a large design element made up of many smaller design elements. If we look for a next higher level normative standard, the judgement about this first standard becomes objective in the same way that each design element judgement was in terms of the first standard. In principle, then, every value problem can be transformed into a problem of fact by moving to a more general, more encompassing goal definition. See figure 5. So once we know the most general goal of the design problem, we may work backwards and determine all the design elements required to realize that goal.¹¹ While we have shown that the design process is in principle objective, if we are to use this process in the solution of actual design problems, we must examine the way in which the efficacious worth of design elements is evaluated. How do we determine that a design element will realize the goal?

Prediction. We may view the problem as an incongruency between the actual state of affairs -- an unrealized goal -- and the desired state of affairs -- a realized goal. In order to remove the incongruency, someone must make a plan of the changes he thinks are necessary in order to assure the satisfaction of the need in question. This is a definition

of the design activity in its most general form, and is, in fact, an adaptive mechanism used by everyone in coping with life. We guess what changes are necessary to meet the goal and carry these changes out in the hope our guesses were correct. If the affiliation needs of the Latins were not being satisfied, someone might guess that a change in the position of the night center would assure satisfaction of their needs.

But since trial and error in building design and construction is very costly, we cannot afford to make many guesses of the nature mentioned above. The guesswork about the relationship between a change in the existing environment and the satisfaction of an unsatisfied need must be minimized. Accurate predictive methods are needed to achieve this end.

Any prediction technique's theoretical basis is predicated upon some form of determinism in the realm of the events being predicted. In other words, if we are to be able to predict that event X will occur, we must be sure that every time its causes appear event X will necessarily occur. If both the necessary and sufficient causes of an event are known, we may predict with absolute certainty that when the causes are existent the event will occur. Good prediction, then, is directly proportional to the amount of information known about the deterministic relationship between causes and effects. Our limitations on the accuracy of prediction are due to limited empirical knowledge and not

indeterminacy. We may conclude that if we knew all the forces acting on a tree - the aerodynamic shape of the leaf, wind velocity, chemical properties, etc., we would be able to predict exactly where the leaf would fall. As the knowledge of the tree grows progressively less, the accuracy of the prediction becomes less.

In principal, then, with enough information the designers of our environment could predict exactly what physical form would satisfy our biological needs, and in so doing attain a humanistic environment.

CHAPTER IV

SUMMARY

1. NEEDS

- a. Each individual has a set of biological needs which must be satisfied if he is to remain healthy.
- b. He attempts to satisfy his needs by taking action to change the environment immediately surrounding him.
- c. Unfortunately, due to complex external forces, the environment often will not respond to the individual's actions.
- d. Since a thwarted change attempt results in a frustrated need, the individual directs even more attention to the fulfillment of that need.
- e. Due both to the condition mentioned above and the unique nature of each human's potential skill development (given by heredity), every individual has a unique set of needs within the species-wide need framework.

2. CULTURAL INSTITUTIONS

- a. In principle, an individual could satisfy any one need with hundreds of different actions, but he doesn't because his actions are directed and limited by his culture.
- b. Need satiation actions are directed through the culture; therefore, the culture is largely responsible for the thwarted

actions mentioned in lc and hence largely determines the idiosyncratic need set mentioned in le.

- c. The culture also provides "tools" used to carry out satiation actions. Social, economic and political systems, physical artifacts (automobiles, shovels, etc.), and the built environment are all tools in this sense.
- d. Historically, until the Industrial Revolution, an equilibrium had been reached between the set of cultural tools and the set of biological needs.

3. HUMANE SOCIETY

- a. The ideal humane society is one which satisfies the needs of every individual within the society.
- b. However, because 1) granting unlimited freedom to one person to satisfy needs will inevitably deny another person the same freedom, and 2) cultures change so rapidly in a technological civilization that natural selection processes can no longer achieve the equilibrium mentioned in 2d, and 3) historically the designers of our built environment have ignored the moral responsibility of their task, we have not attained an ideal, humane society.
- c. In order to more closely achieve such a society, we need a value-selecting social system of some type which will equitably

represent the interests of every society member in decision-making processes affecting need satiation.

4. RATIONAL DESIGN

- a. The design activity is, in its most general terms, a conscious effort made to remove the incongruency between the actual state of affairs and the desired state of affairs. In the case of our society, the desired state of affairs is the ideal, humane society, and the actual state of affairs is the distopian mess we live in today.
- b. The design activity is of two parts: first, the determination of the goal, and then the determination of the changes in the existing state of affairs which will attain the goal.
- c. From the value-selecting social system mentioned in 3c, the goals for every change project (i.e., construction project, political system change, etc.) should be able to be developed to optimize need satiation for everyone concerned.
- d. Once the goal of a project is established, all the changes needed to assure the goal can objectively be derived from the goal statement. This is done by predicting possible changes thought necessary to attain the goal and then empirically testing (through simulation, etc.) to see if the changes will indeed attain the goal.

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DIAGRAMS

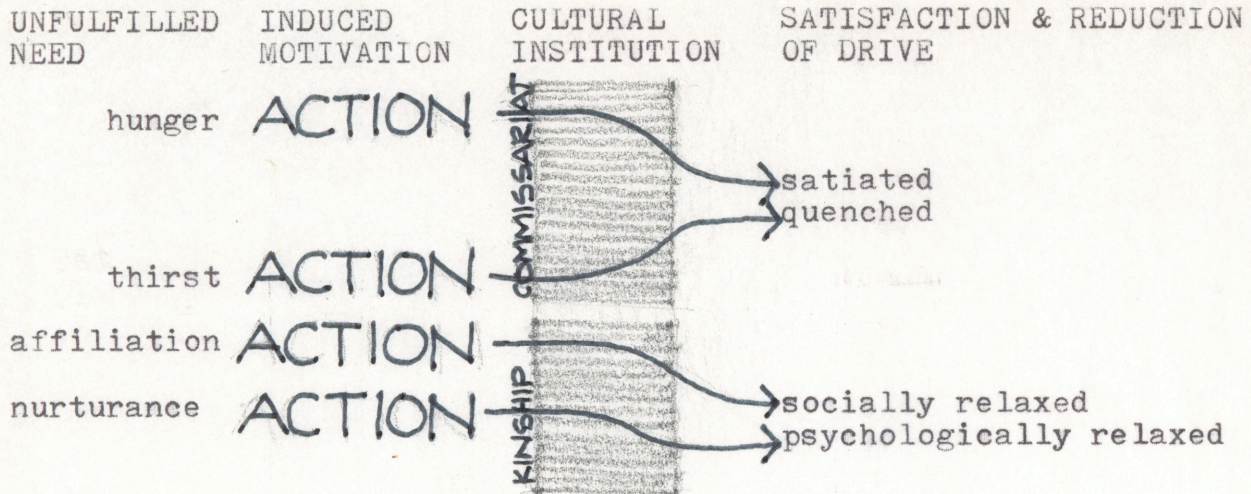


Figure 1.

FIGURE 2.

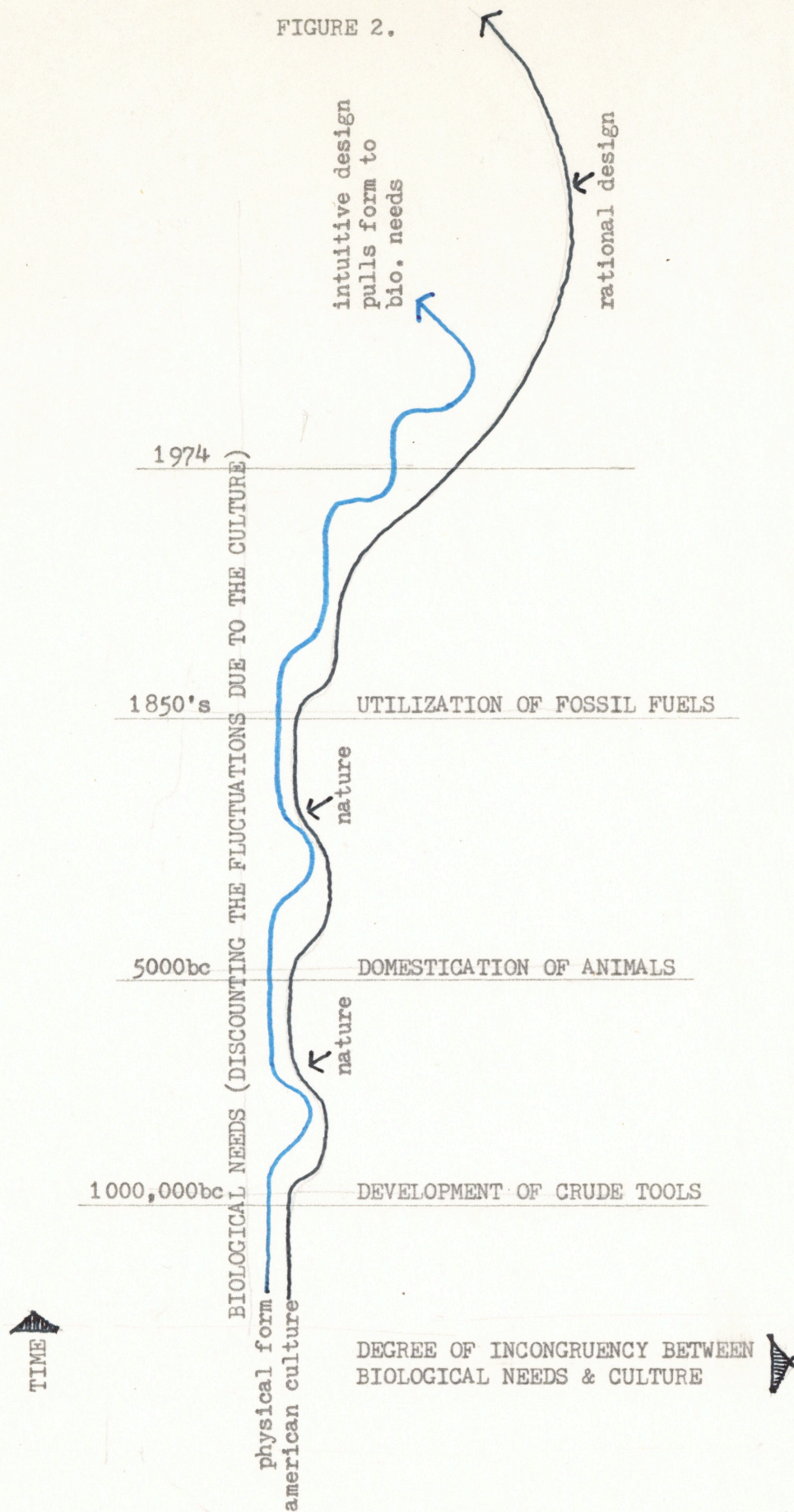


FIGURE 3.

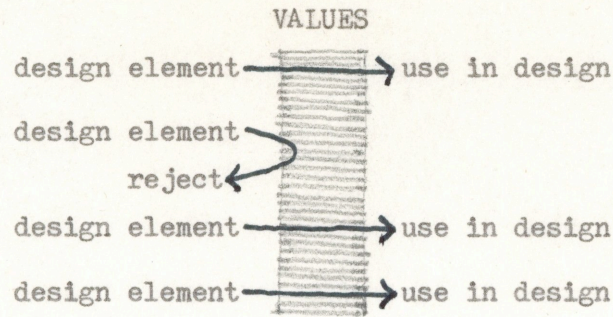


FIGURE 4.

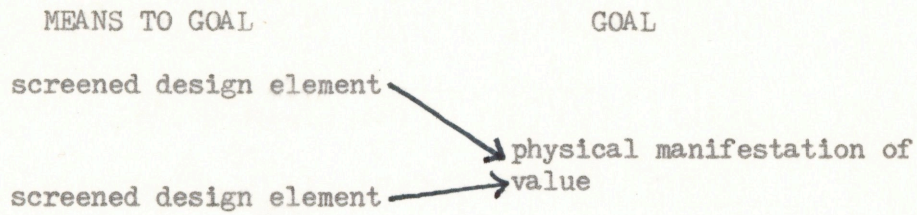
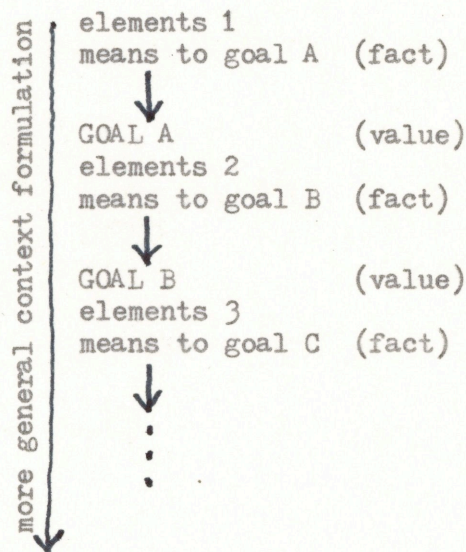


FIGURE 5.



- 1 SMALL GROUP CONFERENCE
- 2 READING
- 3 THINKING
- 4 LARGE GROUP CONFERENCE
- 5 CONSTRUCTION
- 6 SIMULATION
- 7 LARGE GROUP TESTING
- 8 SOCIAL INTERACTION
- 9 FOOD SERVICE
- 10 FOOD PREPARATION
- 11 LARGE GROUP CONFERENCE
- 12 MUSICAL PRODUCTIONS
- 13 STAGE PRODUCTIONS
- 14 MEDIA COVERAGE
- 15 FILM PRODUCTIONS
- 16 LAYOUT
- 17 PHOTOGRAPHY
- 18 OFF-SET PRESS
- 19 DISPLAY
- 20 INFORMATION RETRIEVAL
- 21 VISITOR HANDLING
- 22 DESIGN & DRAWING
- 23 PRINTMAKING
- 24 METALSMITHING
- 25 SCULPTURE
- 26 CERAMICS
- 27 PAINTING
- 28 TEXTILES
- 29 CONSTRUCTION

THE ACTIVITIES

-OPERATION: MUSIC LISTENING

NUMBER: _____

(12)

-INPUT:

PERSONNEL: 1-10 PEOPLE

* MATERIAL: RECORDS, TAPES

-OUTPUT:

PERSONNEL: -

* MATERIAL: -

-OPERATION PARAMETERS:

PHYSIOLOGICAL

* 1. THERMAL COMFORT LEVEL: _____

* 2. LUMINOUS COMFORT LEVEL:

a. BRIGHTNESS ON TASK: 10f.c. 30f.c. AT RECORDS

b. BACKGROUND BRIGHTNESS: 3f.c. 10f.c.

3. SONIC COMFORT LEVEL:

a. DESIRED SOUND LEVEL AT RECEIVER: ---

* b. MAXIMUM BACKGROUND NOISE LEVEL: NC-15 to NC-20

SOCIOLOGICAL

1. SOCIAL ACCESS/PRIVACY:

* a. WHO: EVERYONE IN HOUSE

* b. WHEN: EVERY HOUR

* c. DEGREE OF DIFFICULTY: NONE

2. SOCIAL CONFIGURATION:

* a. SOCIOPETAL/SOCIOFUGAL: _____

b. MONO-CENTERED/MULTI-CENTERED: ON SPEAKERS

c. DEGREE OF DEFENSIBILITY: NONE

3. SOCIAL DISTANCE: OPTIMAL 10 FT. FROM SPEAKER 18" PEOPLE

PSYCHOLOGICAL

1. ORDER 1 2 3 ④ 5 VARIETY

2. AFFILIATION 1 ② 3 4 5 SOLITUDE

3. NURTURANCE 1 2 ③ 4 5 SUCCORANCE

4. AUTONOMY 1 2 ③ 4 5 DEFERENCE

5. EXHIBITION 1 2 3 4 ⑤ OBSERVANCE

6. MEANINGFULNESS IN LIFE VIEW OF LIFE (PLANTS)

7. UNDERSTANDING COMPREHENSION OF COMPOSER & MUSIC

8. SELF-ACTUALIZATION HIGH AESTHETIC EXPERIENCE

-OPERATION TOOLS: TAPE, TURNTABLE, AMP, SPEAKERS, CHAIRS
RECORDS

-DIMENSION REQUIREMENTS:

LENGTH: 10'

WIDTH: 10'

HEIGHT: 8'

-LOADS GENERATED BY THE OPERATION:

WEIGHT:

1. UNIFORM LOAD: _____

2. POINT LOADS: _____

THERMAL LOAD: _____

LUMINOUS LOAD: 30 f.c.

SONIC LOAD: 83 db. @ 250 Hz

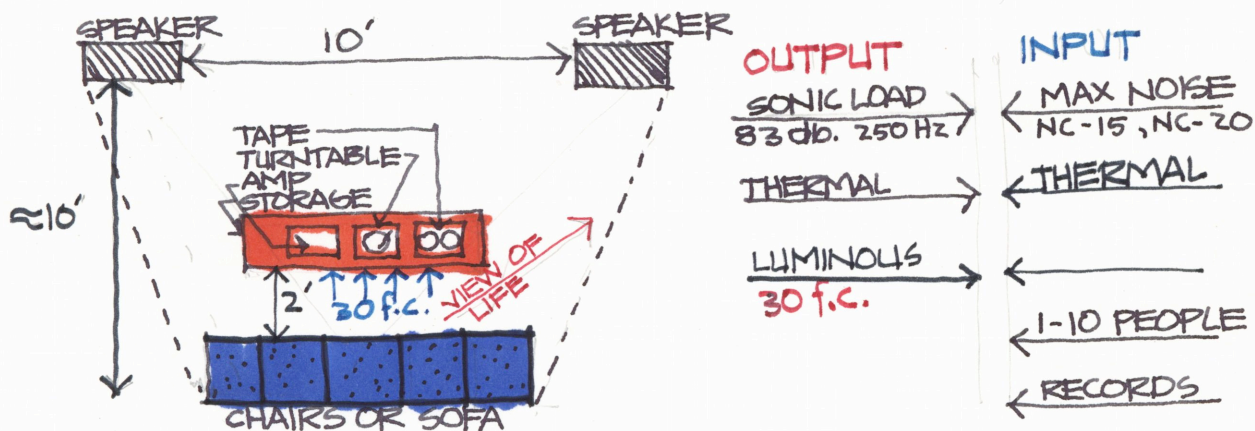
AQUEOUS LOAD: —

SOCIAL LOAD:

1. NUMBER OF PEOPLE: 1-10

2. FREQUENCY OF OPERATION: OFTEN

-DIAGRAM:



-OPERATION: LARGE GROUP CONFERENCE

NUMBER: PROJECT SPACE 1 ④

-INPUT:

PERSONNEL: ~~10~~ 8

* MATERIAL: _____

-OUTPUT:

PERSONNEL: _____

* MATERIAL: _____

-OPERATION PARAMETERS:

PHYSIOLOGICAL

* 1. THERMAL COMFORT LEVEL: _____

* 2. LUMINOUS COMFORT LEVEL:

a. BRIGHTNESS ON TASK: _____

b. BACKGROUND BRIGHTNESS: _____

3. SONIC COMFORT LEVEL:

a. DESIRED SOUND LEVEL AT RECEIVER: —

* b. MAXIMUM BACKGROUND NOISE LEVEL: NC-20 to NC-30

SOCIOLOGICAL

1. SOCIAL ACCESS/PRIVACY:

* a. WHO: _____

* b. WHEN: _____

* c. DEGREE OF DIFFICULTY: _____

2. SOCIAL CONFIGURATION:

* a. SOCIOPETAL/SOCIOFUGAL: _____

b. MONO-CENTERED/MULTI-CENTERED: _____

c. DEGREE OF DEFENSIBILITY: _____

3. SOCIAL DISTANCE: _____

PSYCHOLOGICAL

1. ORDER 1 2 3 4 5 VARIETY

2. AFFILIATION 1 2 3 4 5 SOLITUDE

3. NURTURANCE 1 2 3 4 5 SUCCORANCE

4. AUTONOMY 1 2 3 4 5 DEFERENCE

5. EXHIBITION 1 2 3 4 5 OBSERVANCE

6. MEANINGFULNESS IN LIFE _____

7. UNDERSTANDING _____

8. SELF-ACTUALIZATION _____

-OPERATION TOOLS: _____

-DIMENSION REQUIREMENTS:

LENGTH: _____

WIDTH: _____

HEIGHT: _____

-LOADS GENERATED BY THE OPERATION:

WEIGHT:

1. UNIFORM LOAD: _____

2. POINT LOADS: _____

THERMAL LOAD: _____

LUMINOUS LOAD: _____

SONIC LOAD: _____

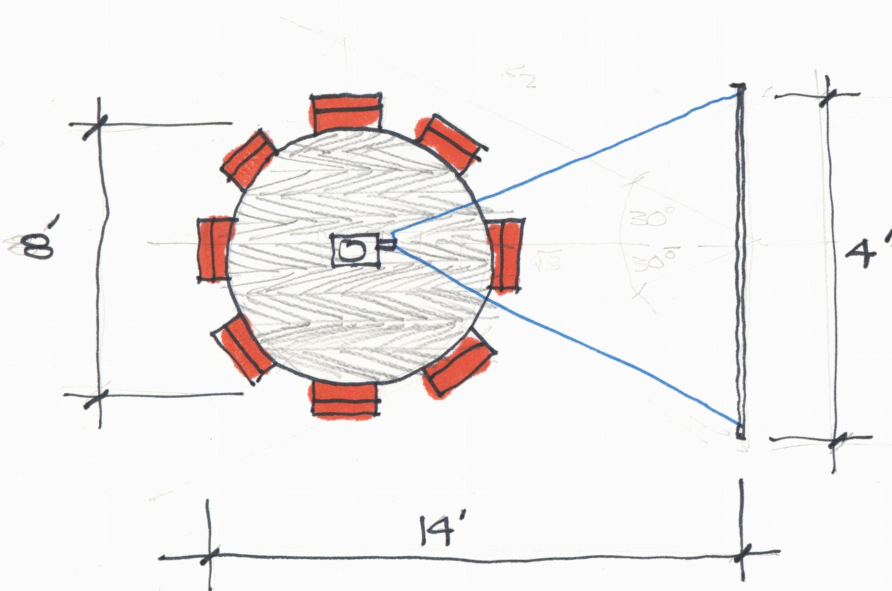
AQUEOUS LOAD: _____

SOCIAL LOAD:

1. NUMBER OF PEOPLE: _____

2. FREQUENCY OF OPERATION: _____

-DIAGRAM:



-OPERATION: THINKING

NUMBER: OFFICE 3

(3)

-INPUT:

PERSONNEL: _____

* MATERIAL: _____

-OUTPUT:

PERSONNEL: _____

* MATERIAL: _____

-OPERATION PARAMETERS:

PHYSIOLOGICAL

* 1. THERMAL COMFORT LEVEL: _____

* 2. LUMINOUS COMFORT LEVEL:

a. BRIGHTNESS ON TASK: _____

b. BACKGROUND BRIGHTNESS: _____

3. SONIC COMFORT LEVEL:

a. DESIRED SOUND LEVEL AT RECEIVER: —

* b. MAXIMUM BACKGROUND NOISE LEVEL: NC-20 to NC-30

SOCIOLOGICAL

1. SOCIAL ACCESS/PRIVACY:

* a. WHO: _____

* b. WHEN: _____

* c. DEGREE OF DIFFICULTY: _____

2. SOCIAL CONFIGURATION:

* a. SOCIOPETAL/SOCIOFUGAL: _____

b. MONO-CENTERED/MULTI-CENTERED: _____

c. DEGREE OF DEFENSIBILITY: _____

3. SOCIAL DISTANCE: _____

PSYCHOLOGICAL

1. ORDER 1 2 3 4 5 VARIETY

2. AFFILIATION 1 2 3 4 5 SOLITUDE

3. NURTURANCE 1 2 3 4 5 SUCCORANCE

4. AUTONOMY 1 2 3 4 5 DEFERENCE

5. EXHIBITION 1 2 3 4 5 OBSERVANCE

6. MEANINGFULNESS IN LIFE _____

7. UNDERSTANDING _____

8. SELF-ACTUALIZATION _____

-OPERATION TOOLS: _____

-DIMENSION REQUIREMENTS:

LENGTH: _____

WIDTH: _____

HEIGHT: _____

-LOADS GENERATED BY THE OPERATION:

WEIGHT:

1. UNIFORM LOAD: _____

2. POINT LOADS: _____

THERMAL LOAD: _____

LUMINOUS LOAD: _____

SONIC LOAD: _____

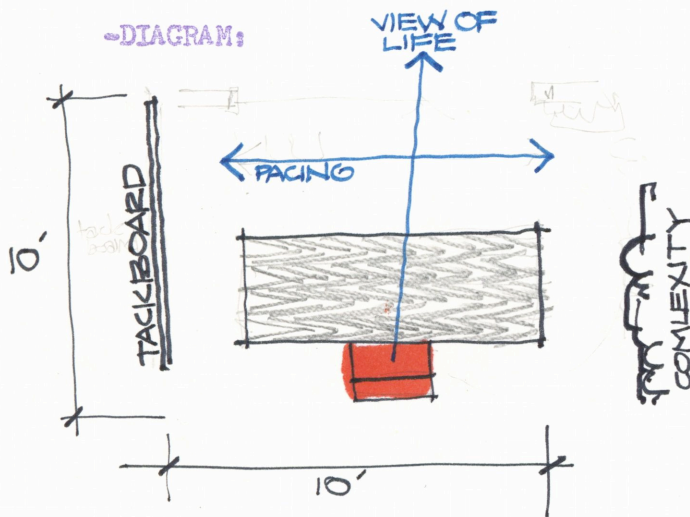
AQUEOUS LOAD: _____

SOCIAL LOAD:

1. NUMBER OF PEOPLE: _____

2. FREQUENCY OF OPERATION: _____

-DIAGRAM:



-OPERATION: READING

NUMBER: _____

⑪

-INPUT:

PERSONNEL: 1 PERSON

* MATERIAL: BOOKS, PEN, PAPER

-OUTPUT:

PERSONNEL: —

* MATERIAL: —

-OPERATION PARAMETERS:

PHYSIOLOGICAL

* 1. THERMAL COMFORT LEVEL: _____

* 2. LUMINOUS COMFORT LEVEL:

a. BRIGHTNESS ON TASK: 30 f.c. READING, 70 f.c. WRITING

b. BACKGROUND BRIGHTNESS: 10 f.c. 24 f.c.

3. SONIC COMFORT LEVEL:

a. DESIRED SOUND LEVEL AT RECEIVER: —

* b. MAXIMUM BACKGROUND NOISE LEVEL: NC-30 to NC-35

SOCIOLOGICAL

1. SOCIAL ACCESS/PRIVACY:

* a. WHO: READER

* b. WHEN: EVERY HOUR

* c. DEGREE OF DIFFICULTY: —

2. SOCIAL CONFIGURATION:

* a. SOCIOFUGAL/SOCIOFUGAL: —

b. MONO-CENTERED/MULTI-CENTERED: —

c. DEGREE OF DEFENSIBILITY: GREAT

3. SOCIAL DISTANCE: —

PSYCHOLOGICAL

1. ORDER 1 2 ③ 4 5 VARIETY

2. AFFILIATION 1 2 3 4 ⑤ SOLITUDE

3. NURTURANCE 1 2 ③ 4 5 SUCCORANCE

4. AUTONOMY ① 2 3 4 5 DEFERENCE

5. EXHIBITION 1 2 3 4 ⑤ OBSERVANCE

6. MEANINGFULNESS IN LIFE VIEW OF LIFE

7. UNDERSTANDING COMPREHENSION OF WRITERS & BOOKS

8. SELF-ACTUALIZATION HIGH AESTHETIC EXPERIENCE

-OPERATION TOOLS: TABLE, CHAIR, BOOKS, PAPER, PEN,

-DIMENSION REQUIREMENTS:

LENGTH: 12'

WIDTH: 10'

HEIGHT: 7'

-LOADS GENERATED BY THE OPERATION:

WEIGHT:

1. UNIFORM LOAD: _____

2. POINT LOADS: _____

THERMAL LOAD: _____

LUMINOUS LOAD: 70 f.c.

SONIC LOAD: _____

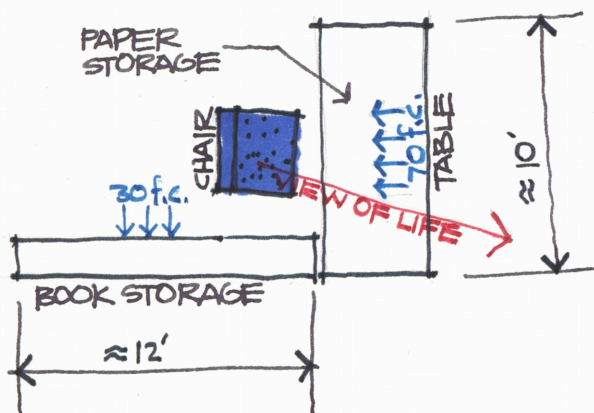
AQUEOUS LOAD: —

SOCIAL LOAD:

1. NUMBER OF PEOPLE: 1

2. FREQUENCY OF OPERATION: OFTEN

-DIAGRAM:



OUTPUT

SONIC LOAD →

THERMAL →

LUMINOUS →

INPUT

← MAX NOISE

← THERMAL

← 1 PERSON

← BOOKS

-OPERATION: LARGE GROUP CONFERENCE

NUMBER: SEMINAR I ⑦

-INPUT:

PERSONNEL: 20

* MATERIAL: _____

-OUTPUT:

PERSONNEL: _____

* MATERIAL: _____

-OPERATION PARAMETERS:

PHYSIOLOGICAL

* 1. THERMAL COMFORT LEVEL: _____

* 2. LUMINOUS COMFORT LEVEL:

a. BRIGHTNESS ON TASK: _____

b. BACKGROUND BRIGHTNESS: _____

3. SONIC COMFORT LEVEL:

a. DESIRED SOUND LEVEL AT RECEIVER: —

* b. MAXIMUM BACKGROUND NOISE LEVEL: NC-20 to NC-30

SOCIOLOGICAL

1. SOCIAL ACCESS/PRIVACY:

* a. WHO: _____

* b. WHEN: _____

* c. DEGREE OF DIFFICULTY: _____

2. SOCIAL CONFIGURATION:

* a. SOCIOPELAL/SOCIOFUGAL: _____

b. MONO-CENTERED/MULTI-CENTERED: _____

c. DEGREE OF DEFENSIBILITY: _____

3. SOCIAL DISTANCE: _____

PSYCHOLOGICAL

1. ORDER 1 2 3 4 5 VARIETY

2. AFFILIATION 1 2 3 4 5 SOLITUDE

3. NURTURANCE 1 2 3 4 5 SUCCORANCE

4. AUTONOMY 1 2 3 4 5 DEFERENCE

5. EXHIBITION 1 2 3 4 5 OBSERVANCE

6. MEANINGFULNESS IN LIFE _____

7. UNDERSTANDING _____

8. SELF-ACTUALIZATION _____

-OPERATION TOOLS: _____

-DIMENSION REQUIREMENTS:

LENGTH: _____

WIDTH: _____

HEIGHT: _____

-LOADS GENERATED BY THE OPERATION:

WEIGHT:

1. UNIFORM LOAD: _____

2. POINT LOADS: _____

THERMAL LOAD: _____

LUMINOUS LOAD: _____

SONIC LOAD: _____

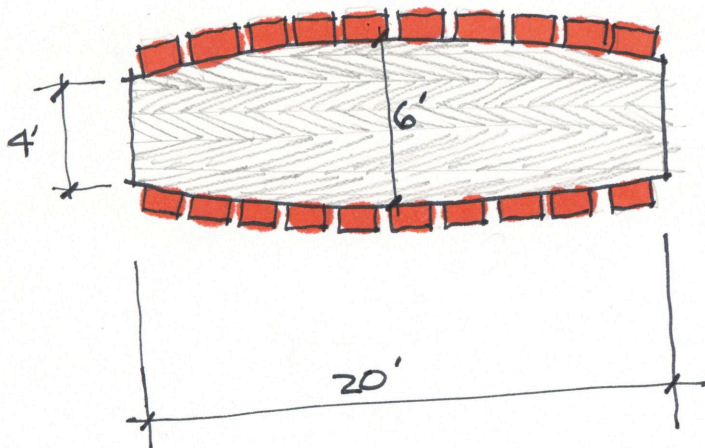
AQUEOUS LOAD: _____

SOCIAL LOAD:

1. NUMBER OF PEOPLE: _____

2. FREQUENCY OF OPERATION: _____

-DIAGRAM:



-OPERATION: SMALL GROUP CONFERENCE

NUMBER: OFFICE 1

①

-INPUT:

PERSONNEL: 3-4

* MATERIAL: SLIDES, TAPE

-OUTPUT:

PERSONNEL: _____

* MATERIAL: _____

-OPERATION PARAMETERS:

PHYSIOLOGICAL

* 1. THERMAL COMFORT LEVEL: _____

* 2. LUMINOUS COMFORT LEVEL:

a. BRIGHTNESS ON TASK: _____

b. BACKGROUND BRIGHTNESS: _____

3. SONIC COMFORT LEVEL:

a. DESIRED SOUND LEVEL AT RECEIVER: —

* b. MAXIMUM BACKGROUND NOISE LEVEL: NC-30 to NC-35

SOCIOLOGICAL

1. SOCIAL ACCESS/PRIVACY:

* a. WHO: _____

* b. WHEN: _____

* c. DEGREE OF DIFFICULTY: _____

2. SOCIAL CONFIGURATION:

* a. SOCIOPETAL/SOCIOFUGAL: _____

b. MONO-CENTERED/MULTI-CENTERED: _____

c. DEGREE OF DEFENSIBILITY: _____

3. SOCIAL DISTANCE: _____

PSYCHOLOGICAL

1. ORDER 1 2 3 4 5 VARIETY

2. AFFILIATION 1 2 3 4 5 SOLITUDE

3. NURTURANCE 1 2 3 4 5 SUCCORANCE

4. AUTONOMY 1 2 3 4 5 DEFERENCE

5. EXHIBITION 1 2 3 4 5 OBSERVANCE

6. MEANINGFULNESS IN LIFE _____

7. UNDERSTANDING _____

8. SELF-ACTUALIZATION _____

-OPERATION TOOLS: _____

-DIMENSION REQUIREMENTS:

LENGTH: _____

WIDTH: _____

HEIGHT: _____

-LOADS GENERATED BY THE OPERATION:

WEIGHT:

1. UNIFORM LOAD: _____

2. POINT LOADS: _____

THERMAL LOAD: _____

LUMINOUS LOAD: _____

SONIC LOAD: _____

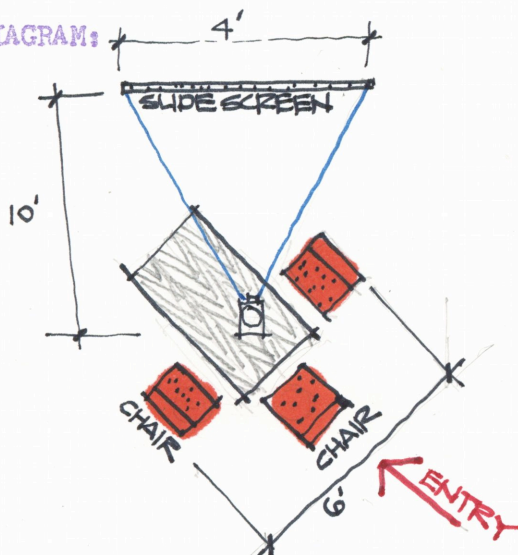
AQUEOUS LOAD: _____

SOCIAL LOAD:

1. NUMBER OF PEOPLE: _____

2. FREQUENCY OF OPERATION: _____

-DIAGRAM:



-OPERATION: SOCIAL INTERACTION

NUMBER: LOUNGE 1 (8)

-INPUT:

PERSONNEL: 20-25

* MATERIAL: _____

-OUTPUT:

PERSONNEL: _____

* MATERIAL: _____

-OPERATION PARAMETERS:

PHYSIOLOGICAL

* 1. THERMAL COMFORT LEVEL: _____

* 2. LUMINOUS COMFORT LEVEL:

a. BRIGHTNESS ON TASK: _____

b. BACKGROUND BRIGHTNESS: _____

3. SONIC COMFORT LEVEL:

a. DESIRED SOUND LEVEL AT RECEIVER: —

* b. MAXIMUM BACKGROUND NOISE LEVEL: NC-30 to NC-35

SOCIOLOGICAL

1. SOCIAL ACCESS/PRIVACY:

* a. WHO: _____

* b. WHEN: _____

* c. DEGREE OF DIFFICULTY: _____

2. SOCIAL CONFIGURATION:

* a. SOCIOPEITAL/SOCIOFUGAL: _____

b. MONO-CENTERED/MULTI-CENTERED: _____

c. DEGREE OF DEFENSIBILITY: _____

3. SOCIAL DISTANCE: _____

PSYCHOLOGICAL

1. ORDER 1 2 3 4 5 VARIETY

2. AFFILIATION 1 2 3 4 5 SOLITUDE

3. NURTURANCE 1 2 3 4 5 SUCCORANCE

4. AUTONOMY 1 2 3 4 5 DEFERENCE

5. EXHIBITION 1 2 3 4 5 OBSERVANCE

6. MEANINGFULNESS IN LIFE _____

7. UNDERSTANDING _____

8. SELF-ACTUALIZATION _____

-OPERATION TOOLS: _____

-DIMENSION REQUIREMENTS:

LENGTH: _____

WIDTH: _____

HEIGHT: _____

-LOADS GENERATED BY THE OPERATION:

WEIGHT:

1. UNIFORM LOAD: _____

2. POINT LOADS: _____

THERMAL LOAD: _____

LUMINOUS LOAD: _____

SONIC LOAD: _____

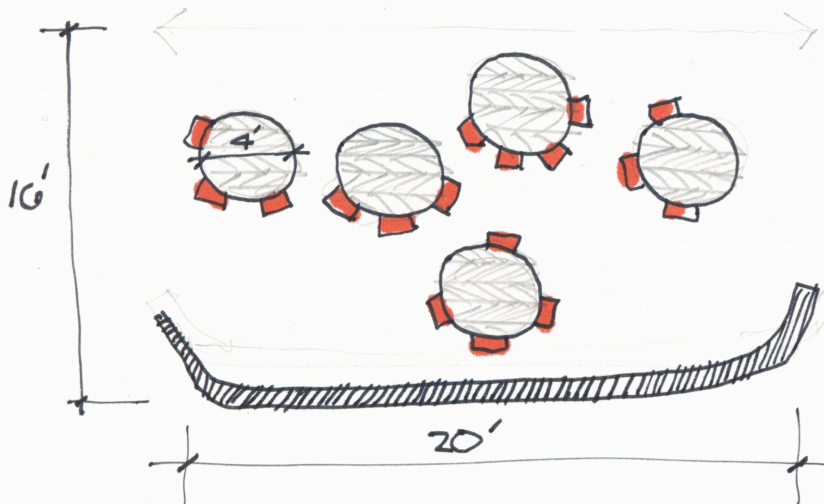
AQUEOUS LOAD: _____

SOCIAL LOAD:

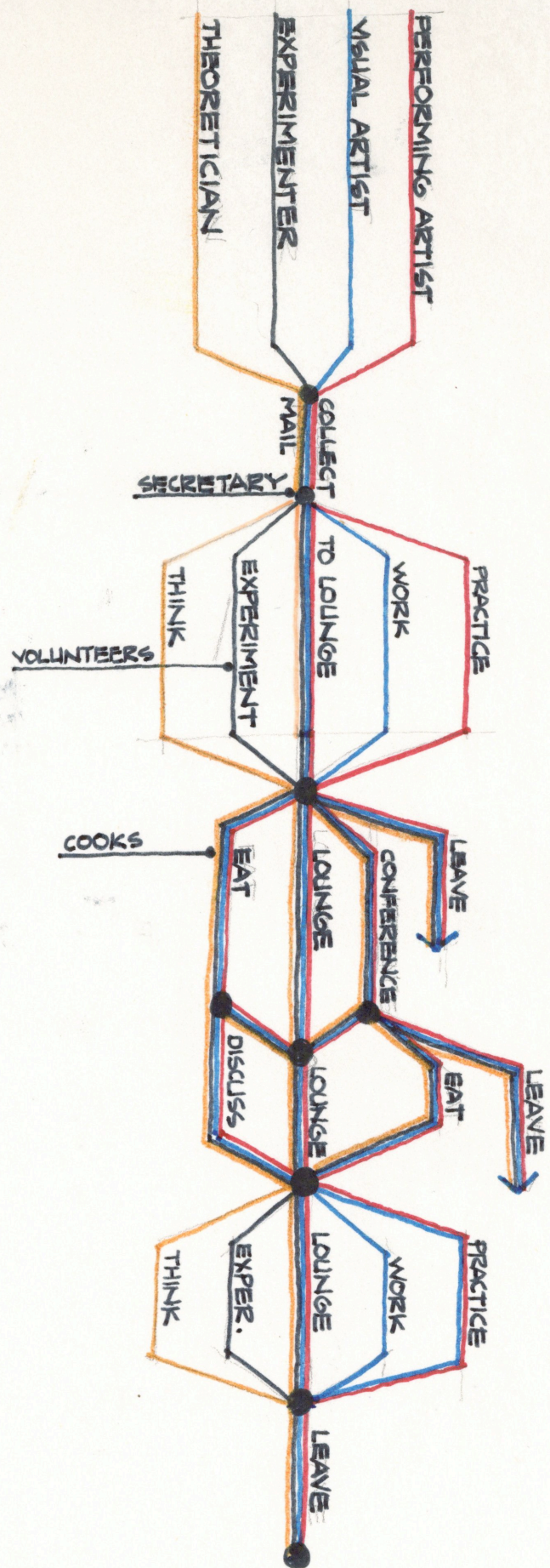
1. NUMBER OF PEOPLE: _____

2. FREQUENCY OF OPERATION: _____

-DIAGRAM:

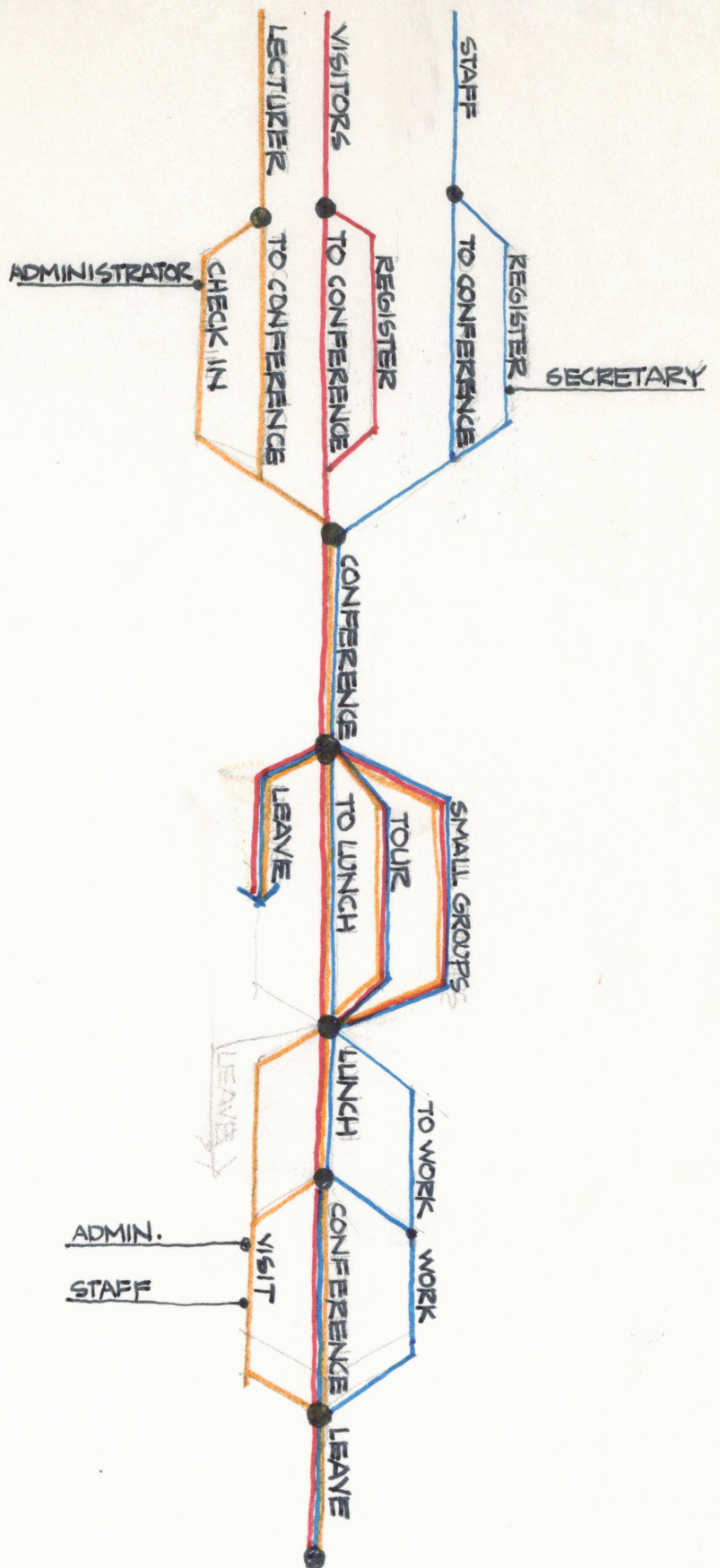


TIME →



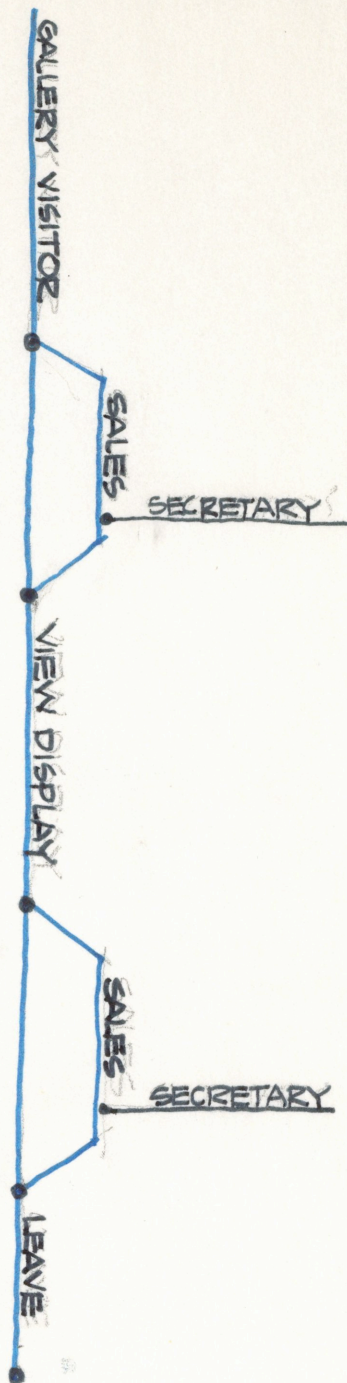
PERSONNEL FLOW GRAPH

STUDY STAFF



PERSONNEL FLOW GRAPH

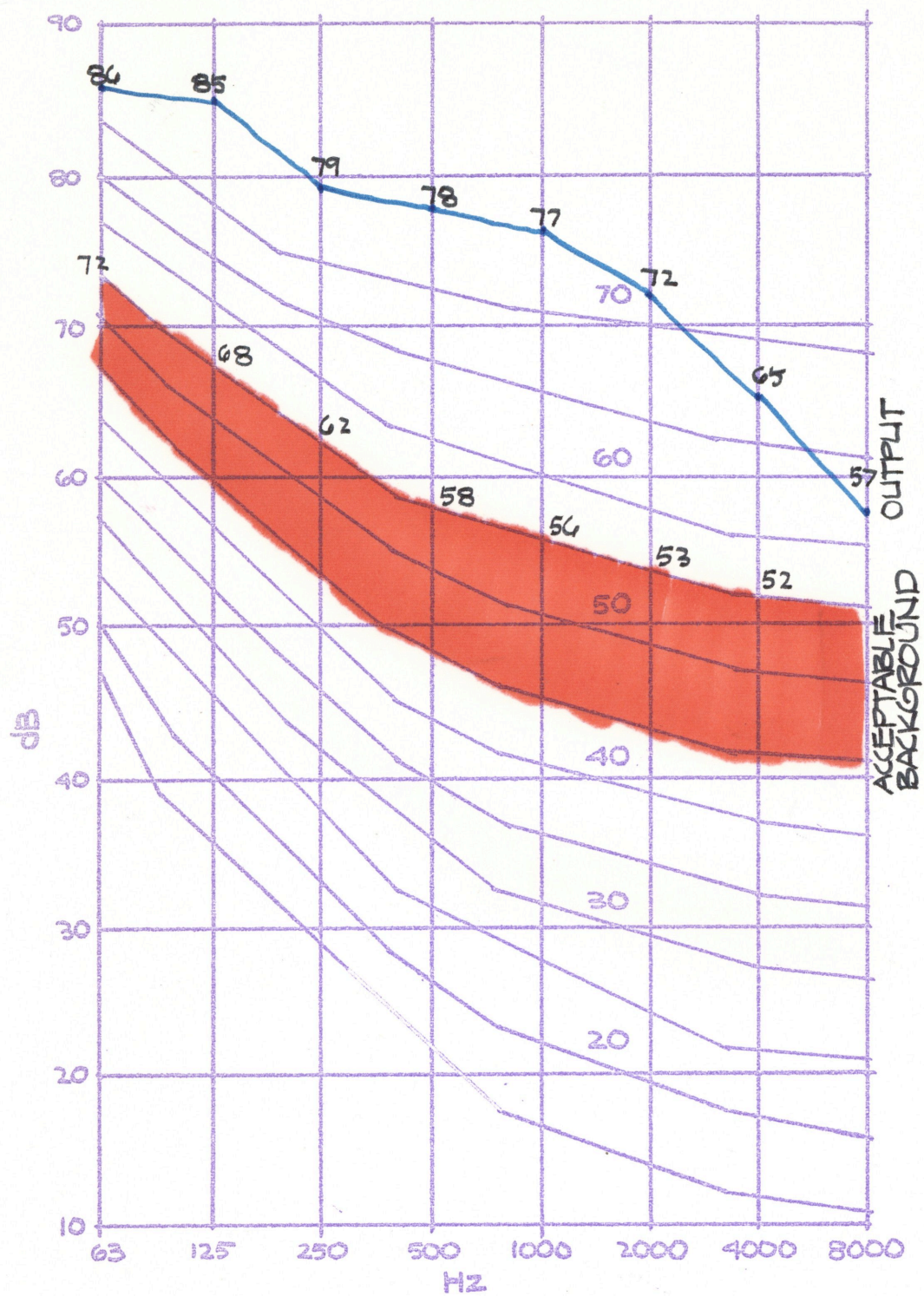
CONFERENCE ATTENDANTS



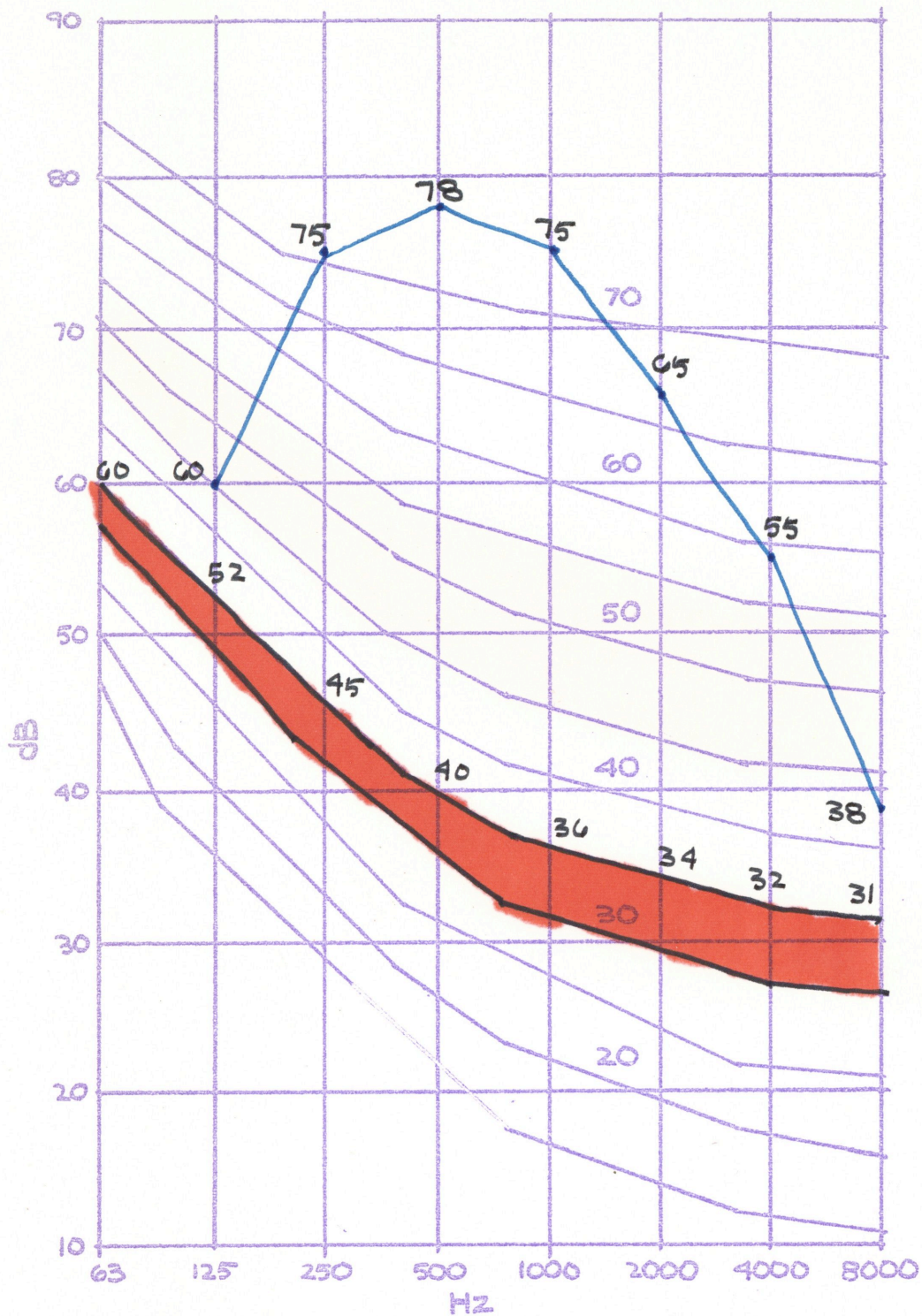
PERSONNEL FLOW GRAPH
GALLERY VISITORS



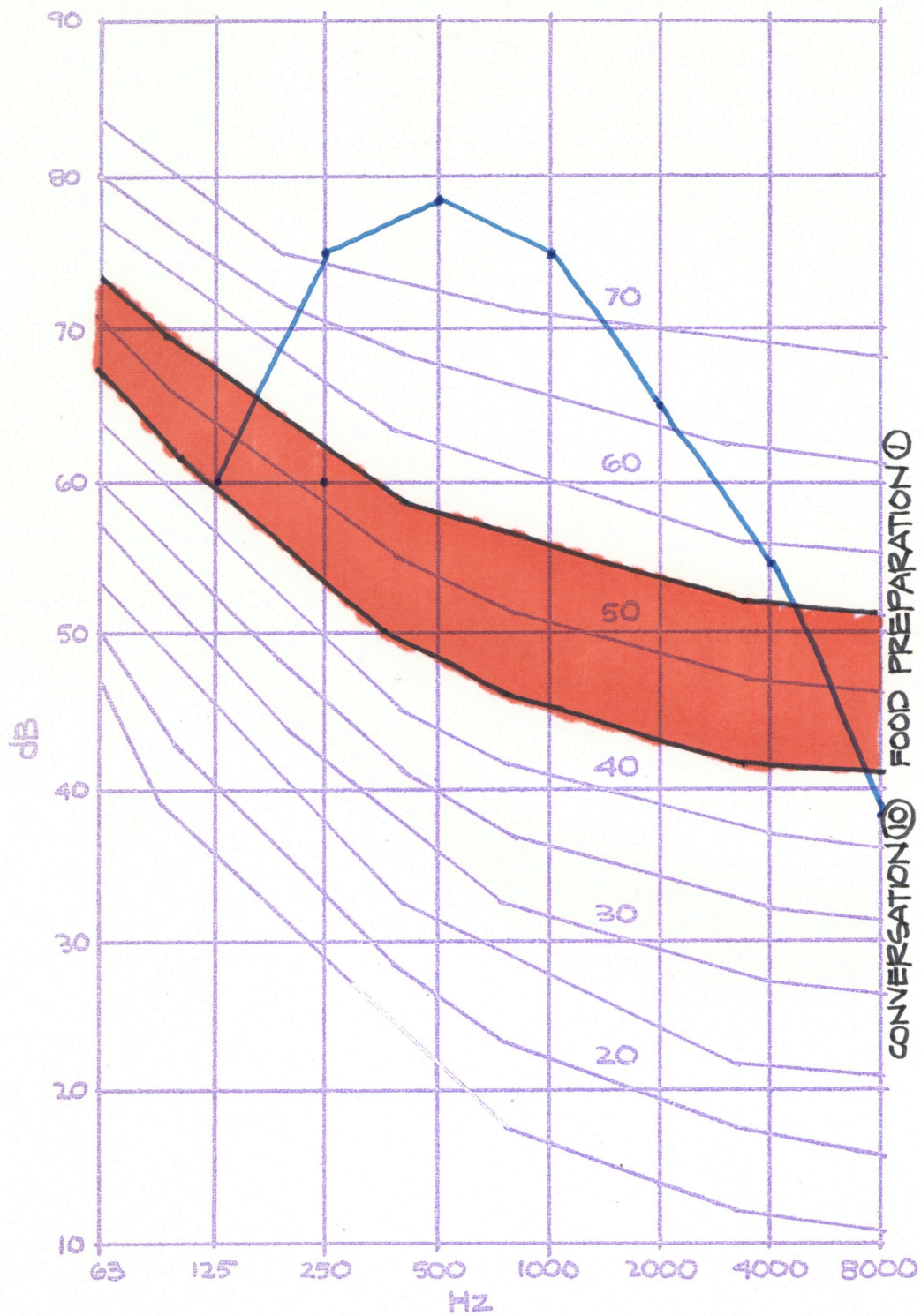
INPUT/OUTPUT GRAPH
EQUIPMENT MOVEMENT (SHOP TOOLS)



FOOD PREPARATION ①



CONVERSATION ⑩



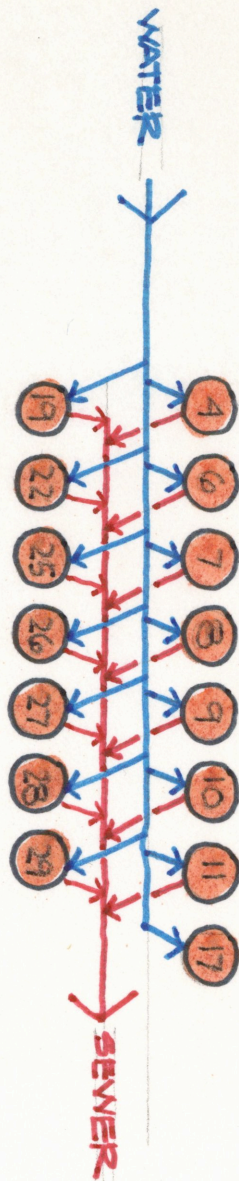
		OUTPUT			
		QUIET	AVERAGE	NOISY	LOUD
DESIRABLE BACKGROUND LEVEL	QUIET	12 13 15 16 20 2 3 17	1 6 14 15 16 23		
	AVERAGE		4 19 21 22 24 28	7 8 9 29	11
	NOISY			10	25 27
	LOUD				5 18 26

CONGRUENCY CRITERIA: SINCE A 2x4 STUD WALL W/ GYP. BD. ON EACH SIDE WILL ABSORB THE FOLLOWING DB LEVELS, THE INCONGRUENCY BETWEEN ONE ACTIVITY'S MAX. ACCEPTABLE BACKGROUND NOISE AND THE OTHER'S OUTPUT MUST NOT EXCEED THESE VALUES:

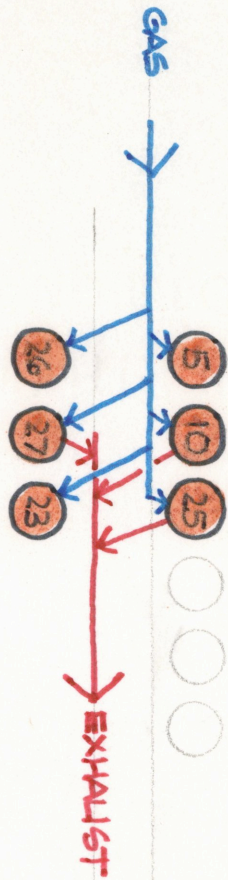
125 Hz 20 dB 250 Hz 20 dB 500 Hz 36 dB 1000 Hz 41 dB 2000 Hz 43 dB 4000 Hz 42 dB

ACTIVITY IMPACT GRAPH

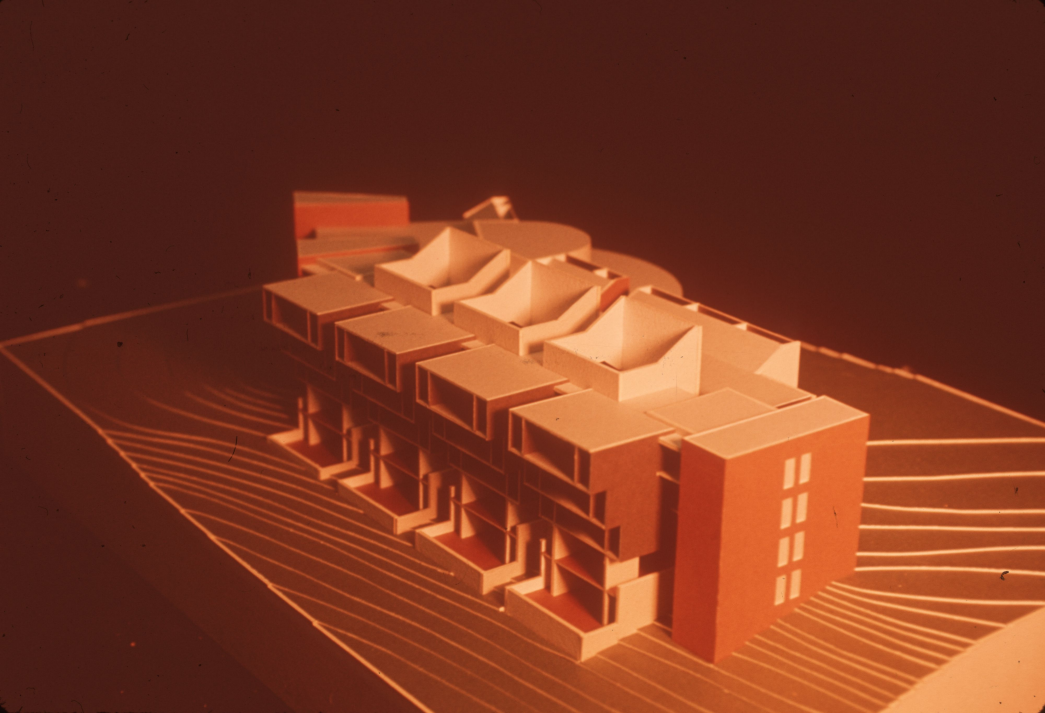
SONIC LEVEL

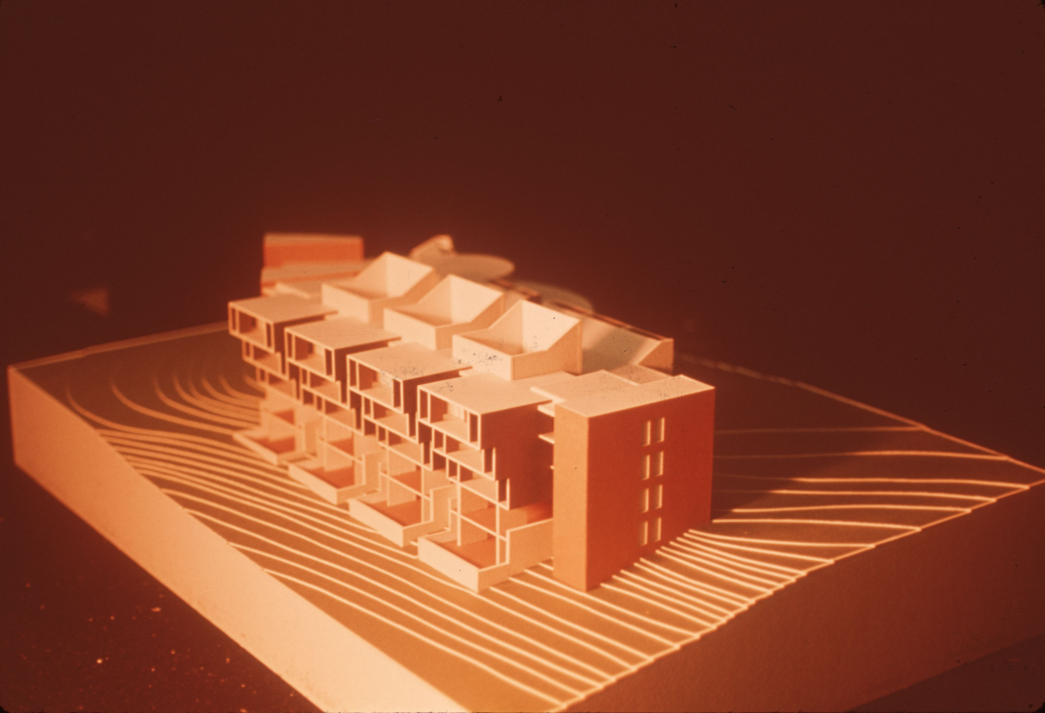


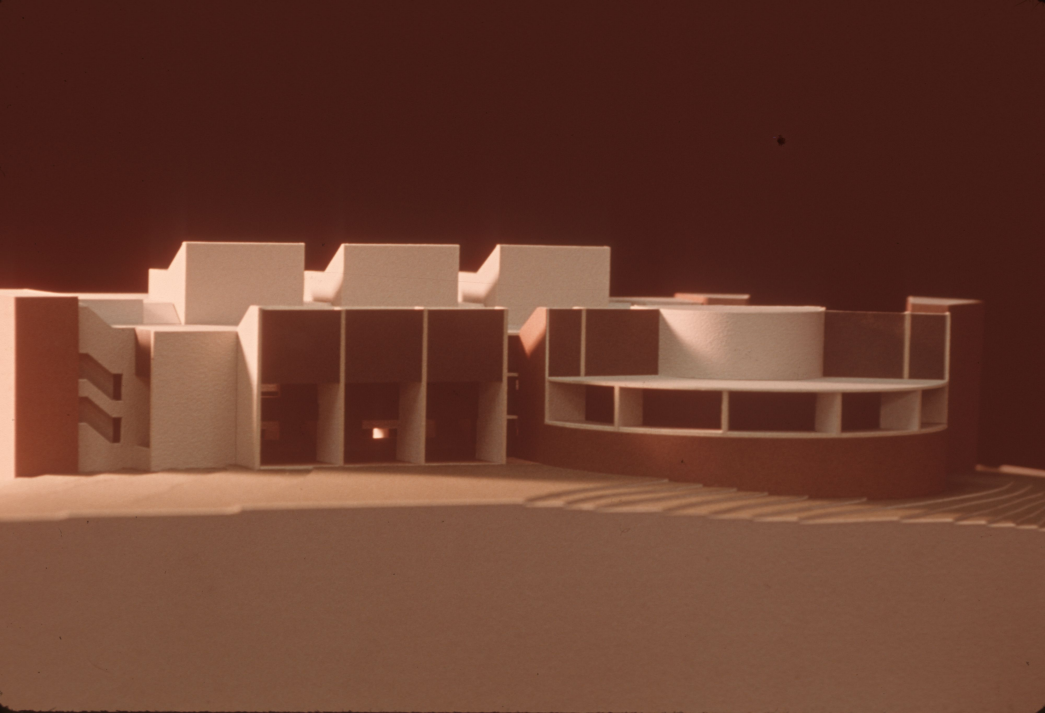
INPUT/OUTPUT GRAPHS
RESOURCES (WATER)

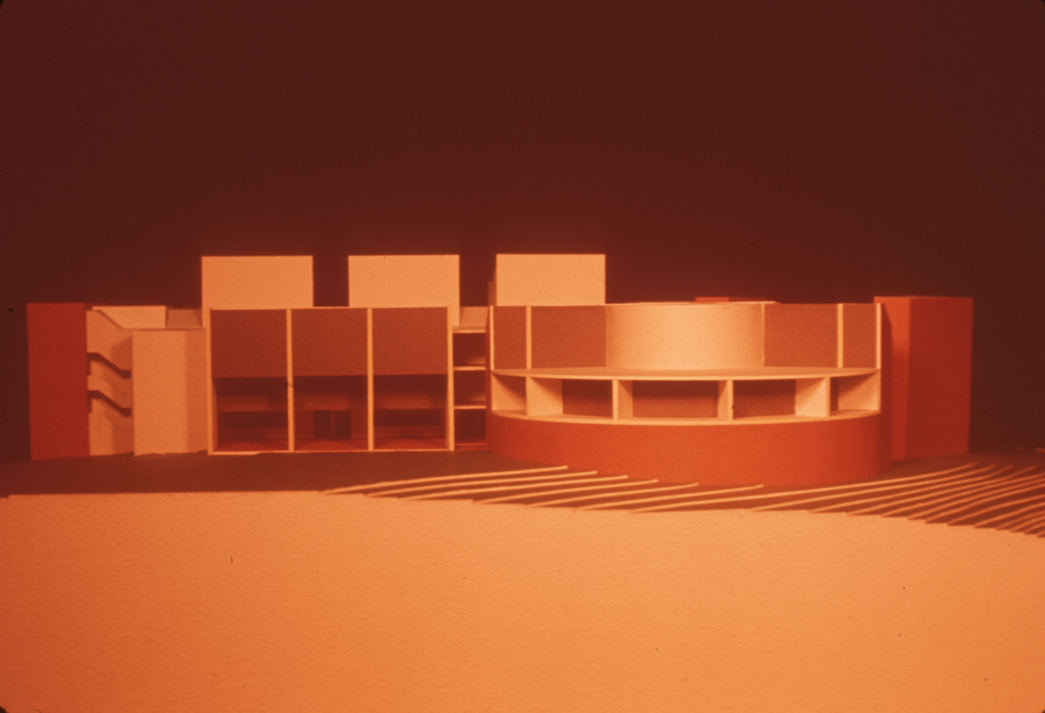


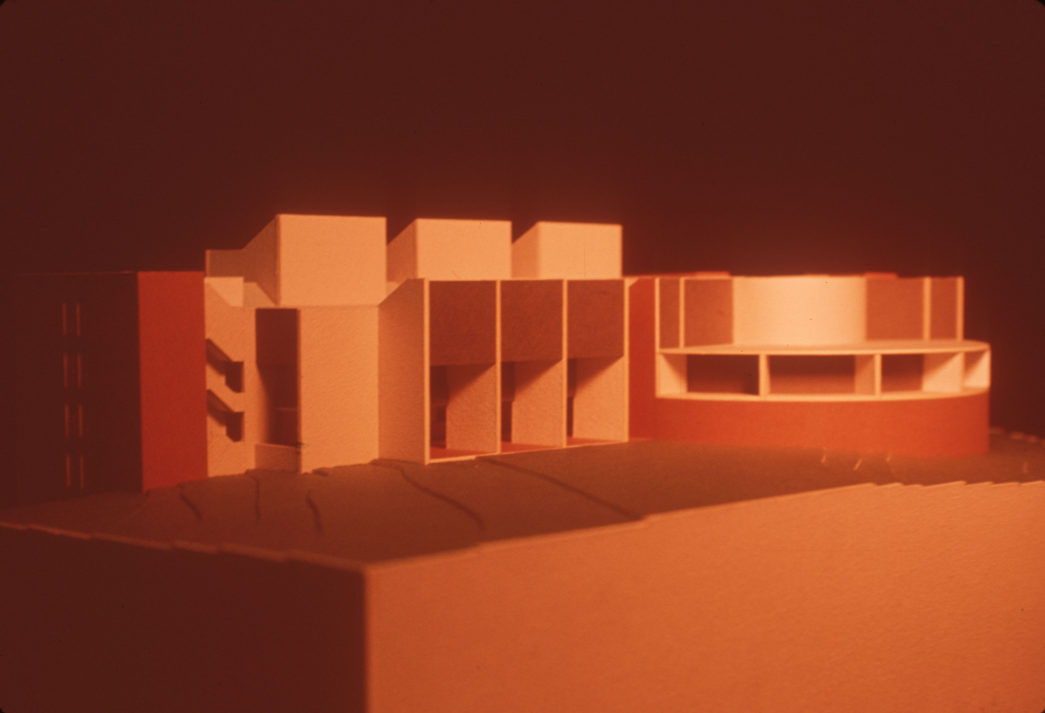
INPUT/OUTPUT GRAPH
RESOURCES(GAS)

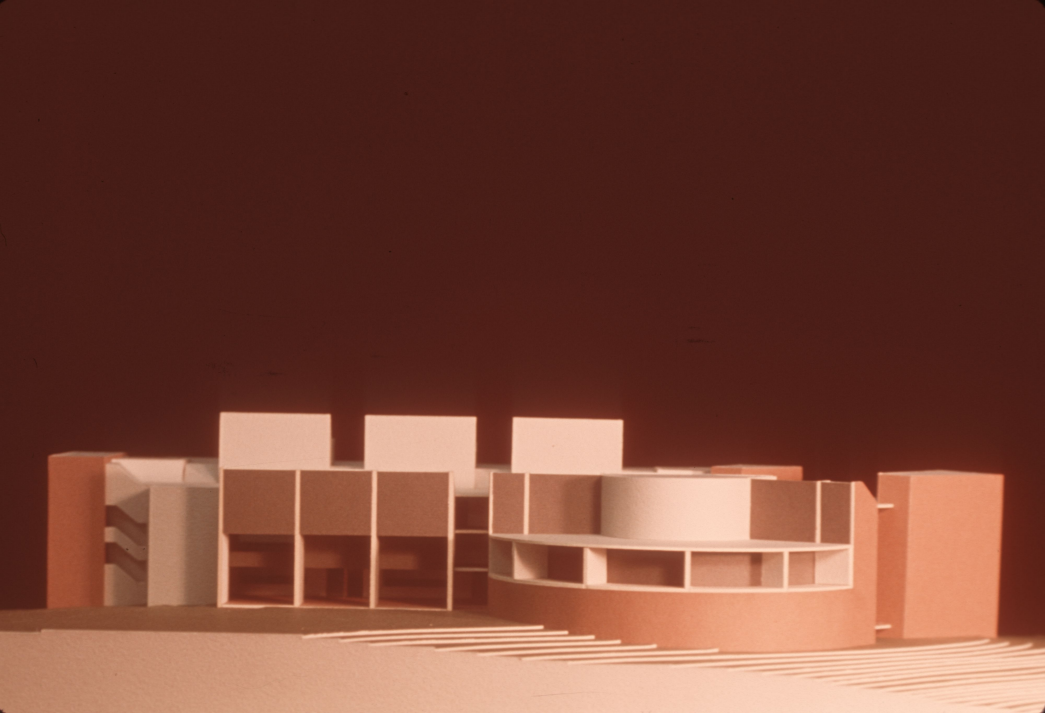


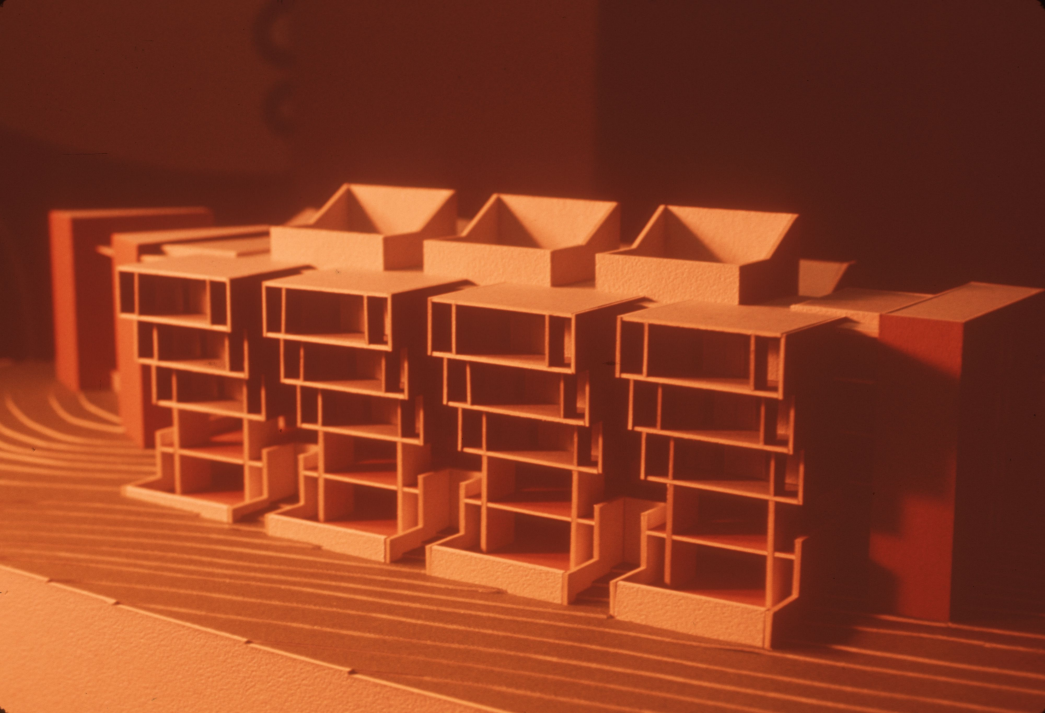


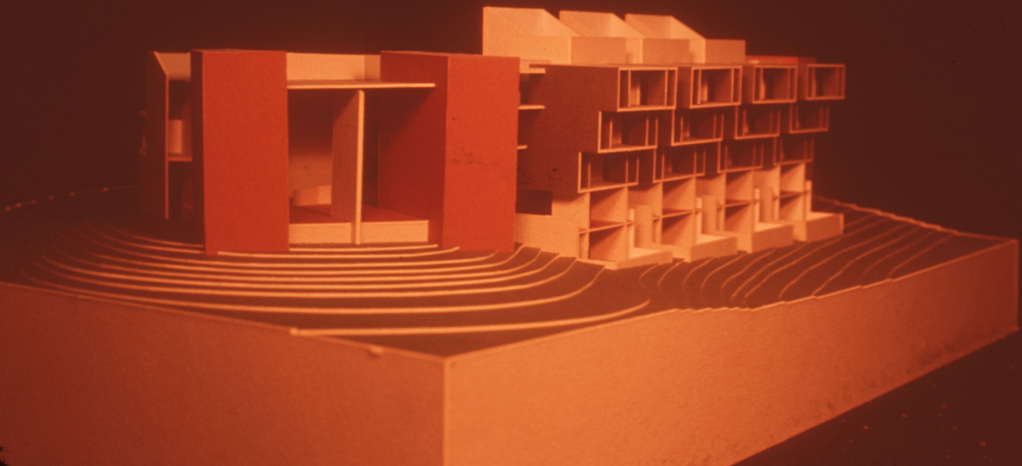


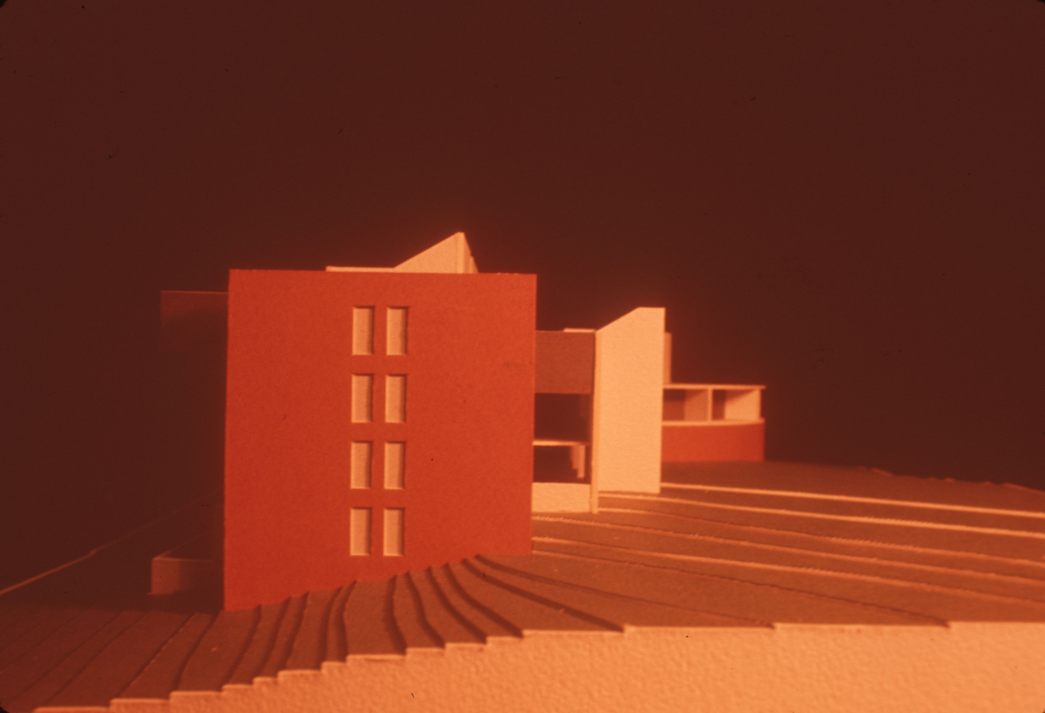


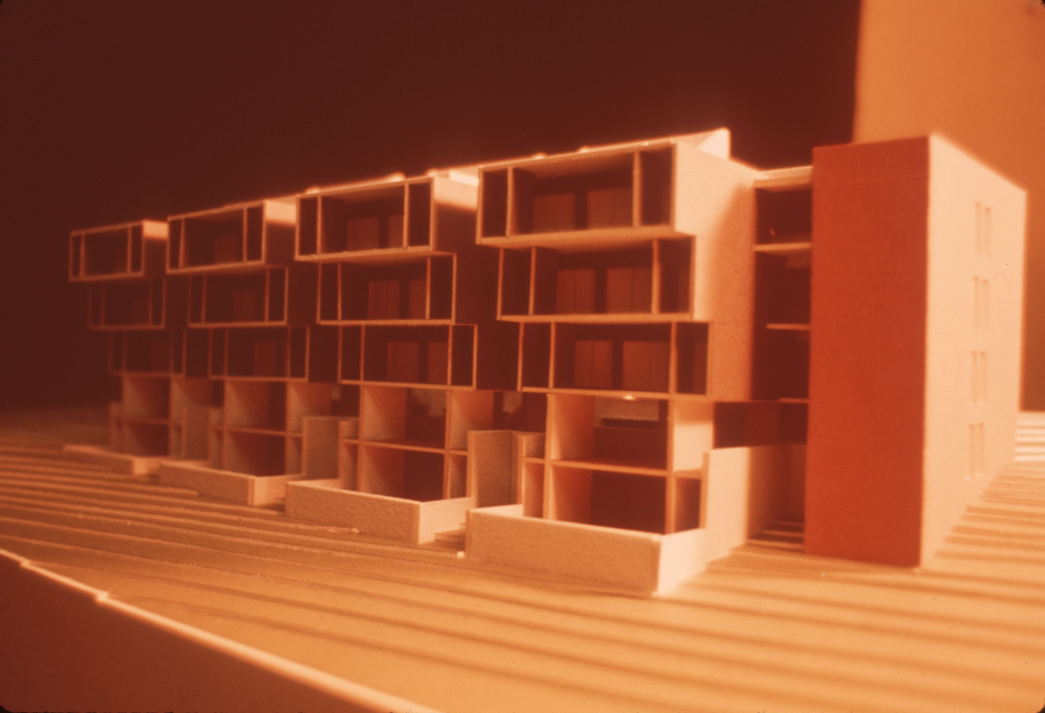


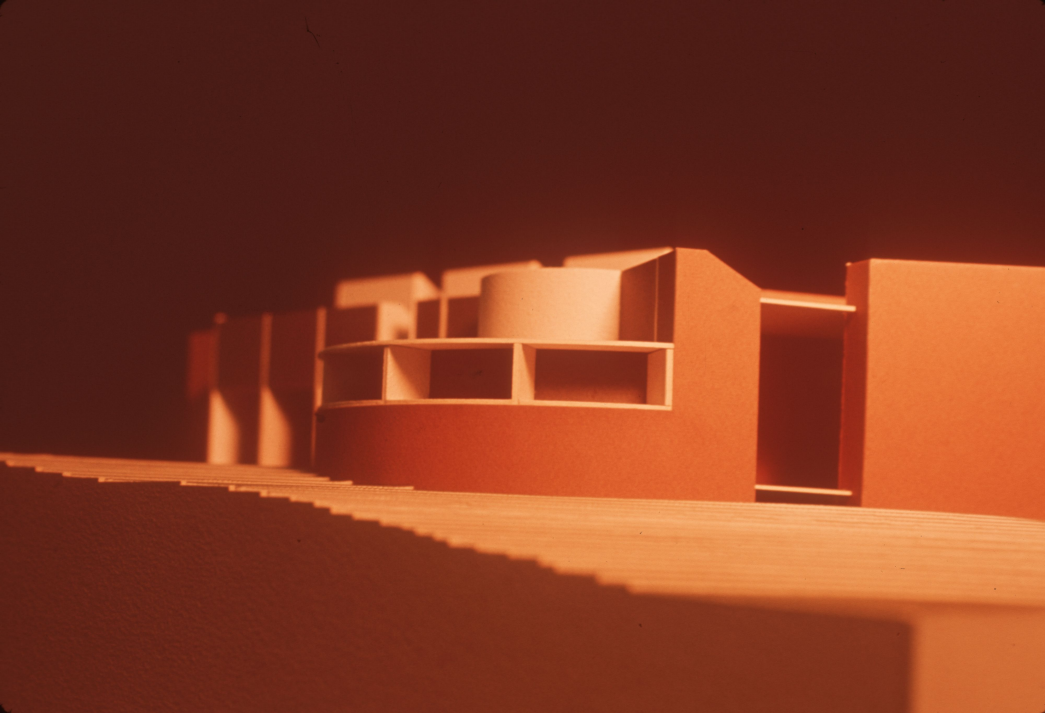


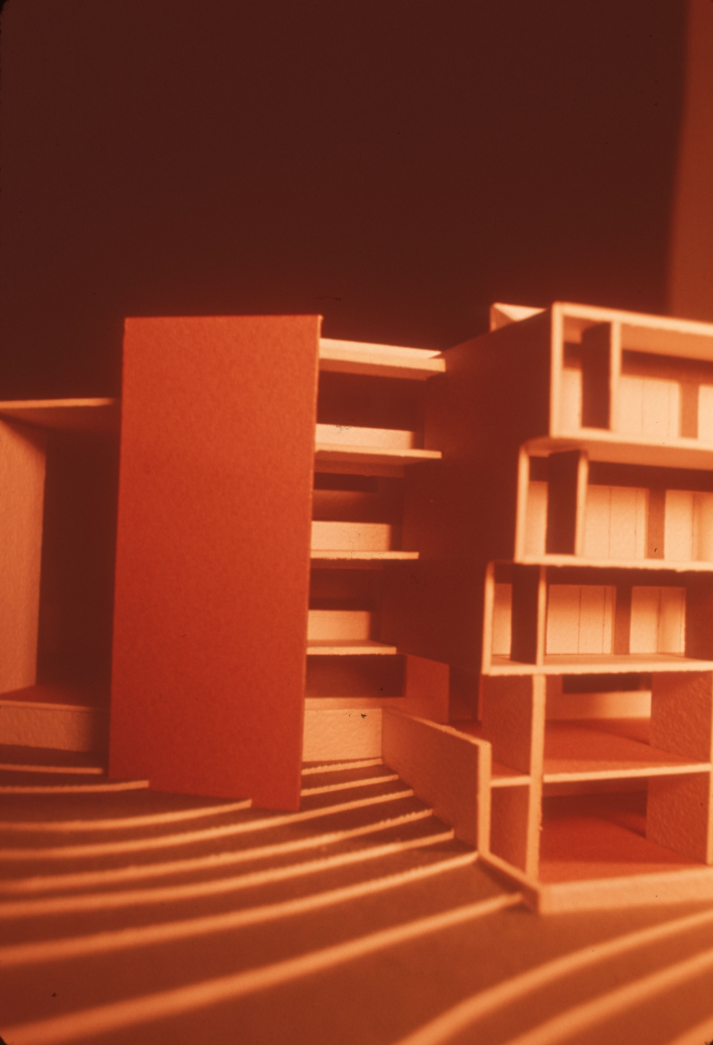


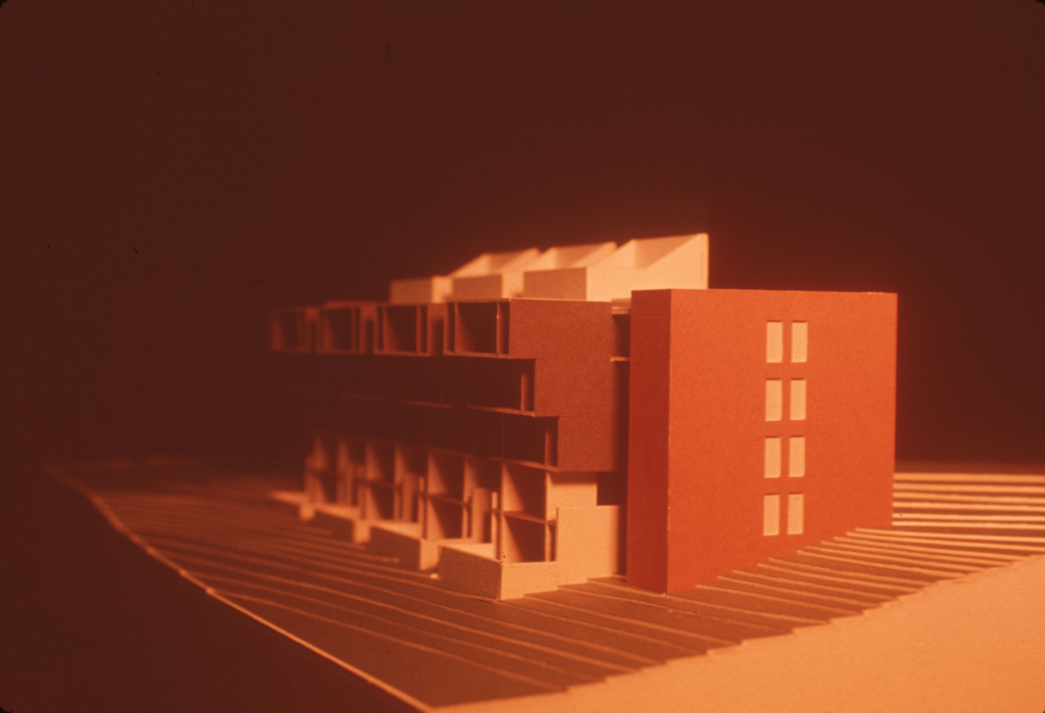


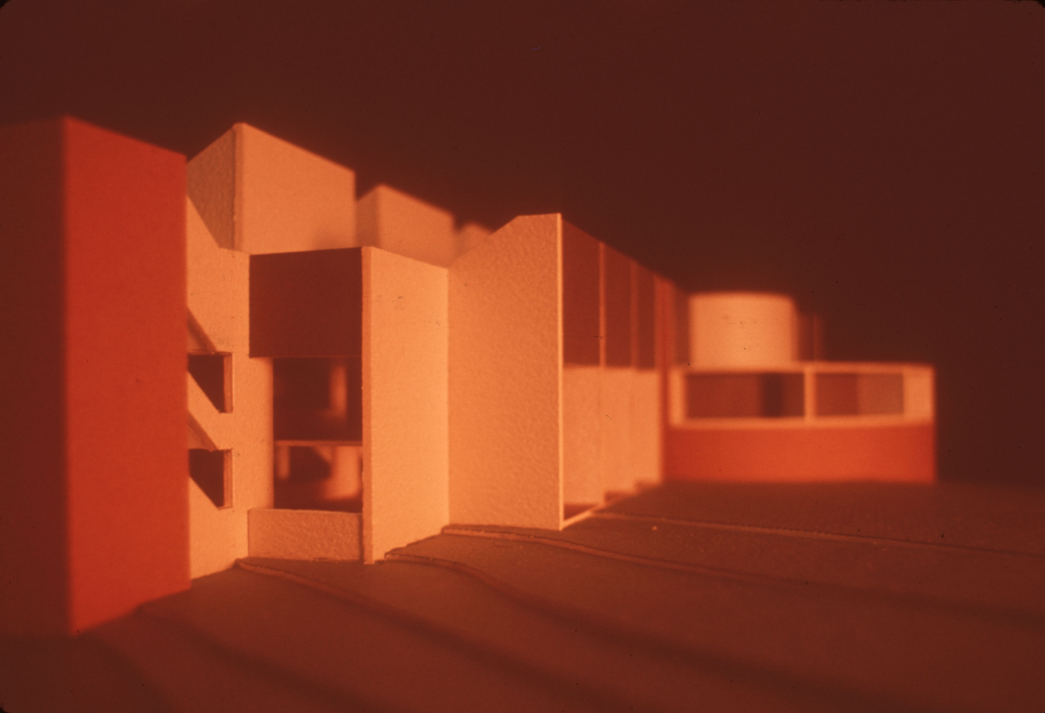




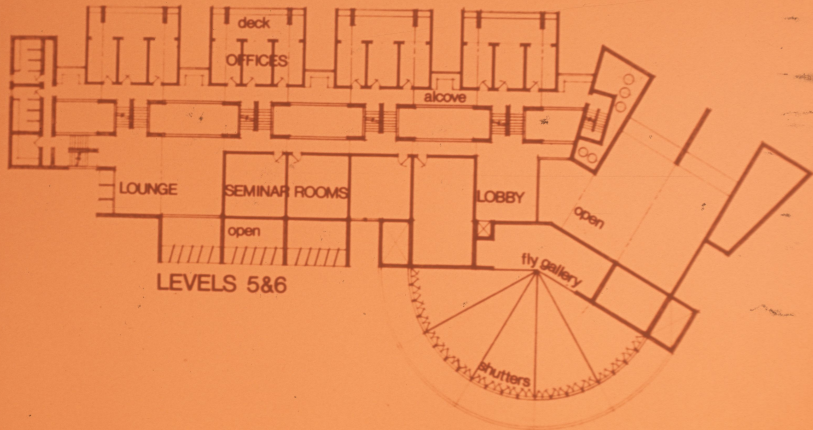


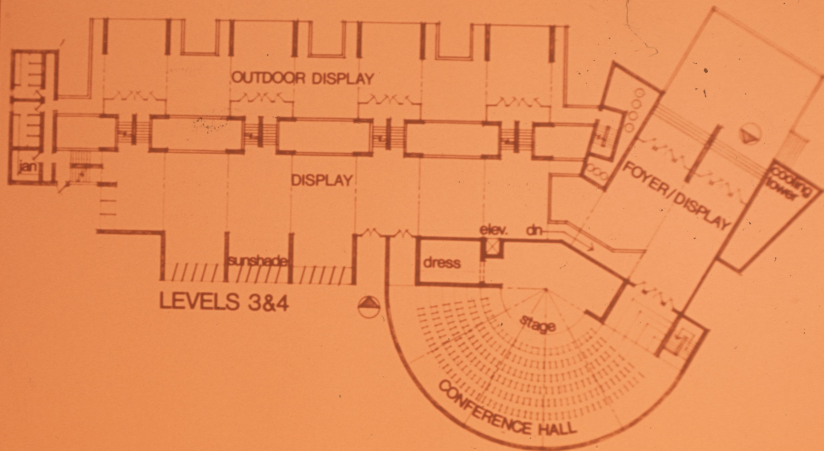


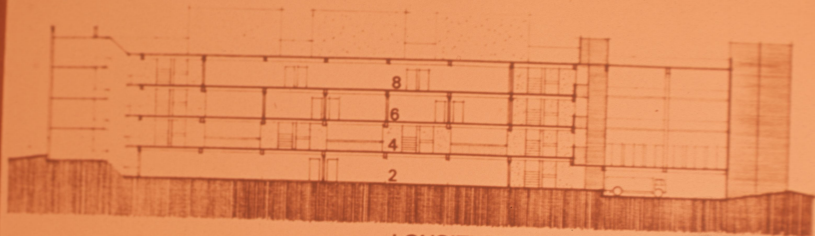




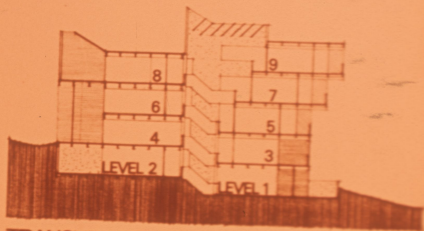




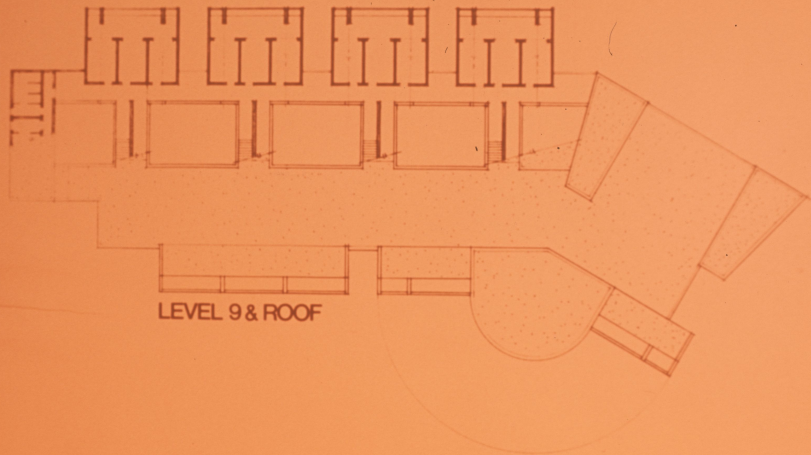


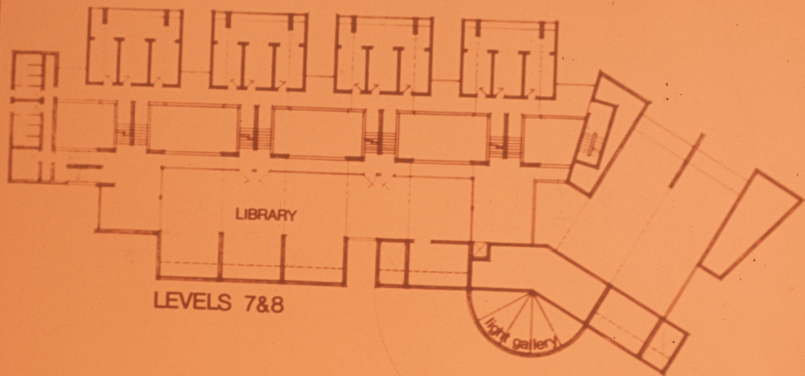


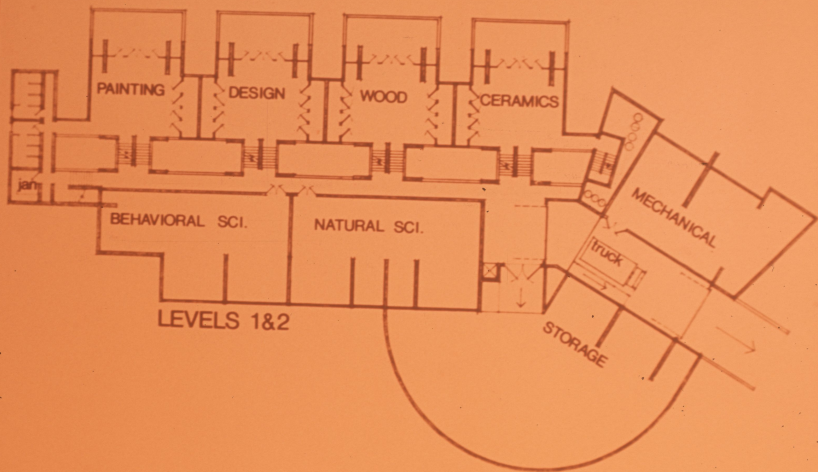
LONGITUDINAL SECTION



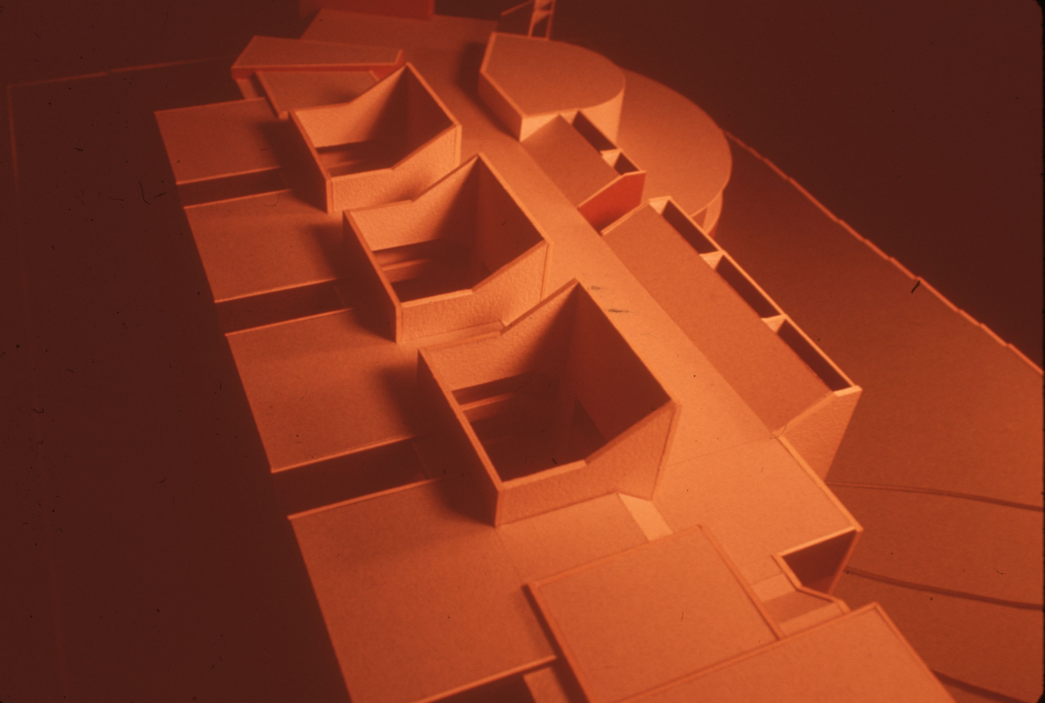
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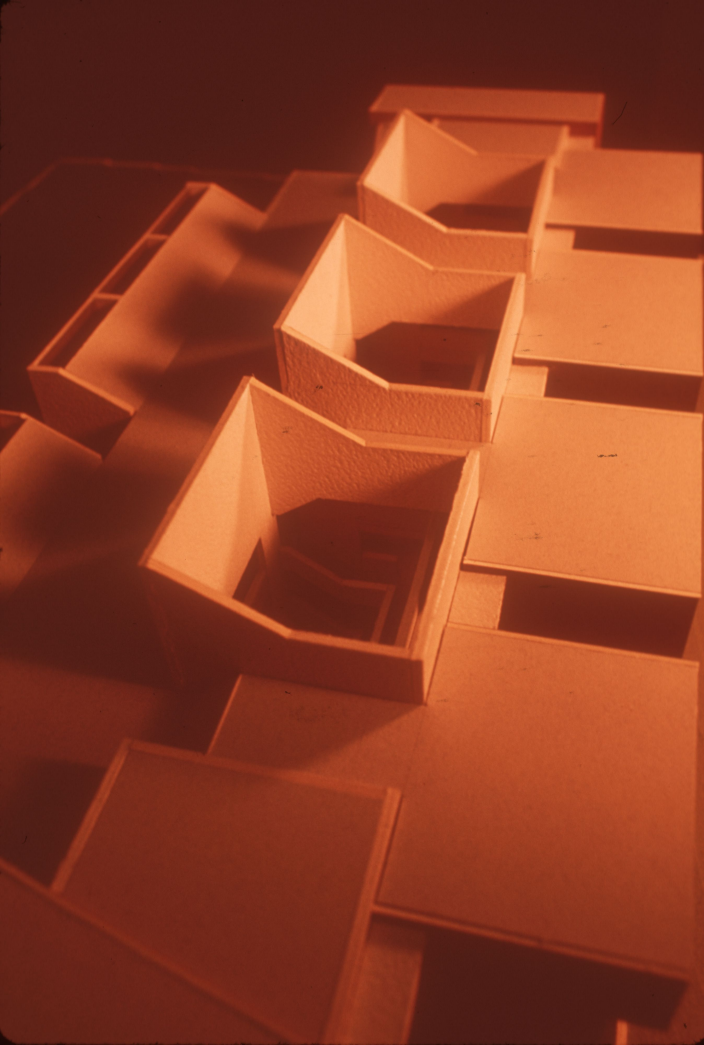




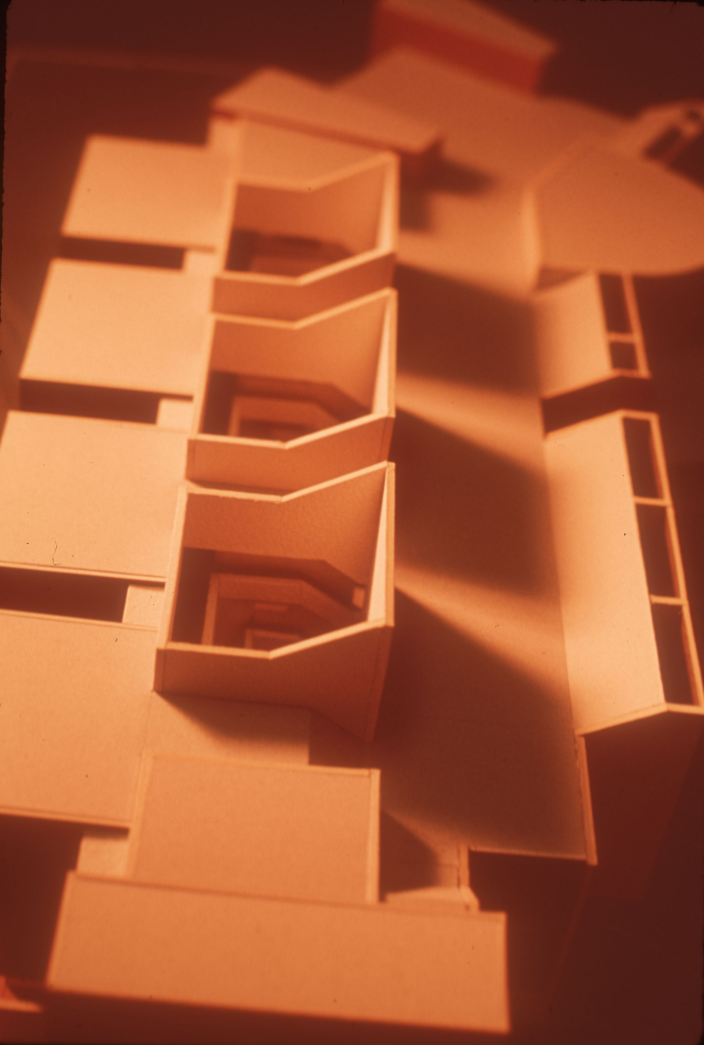


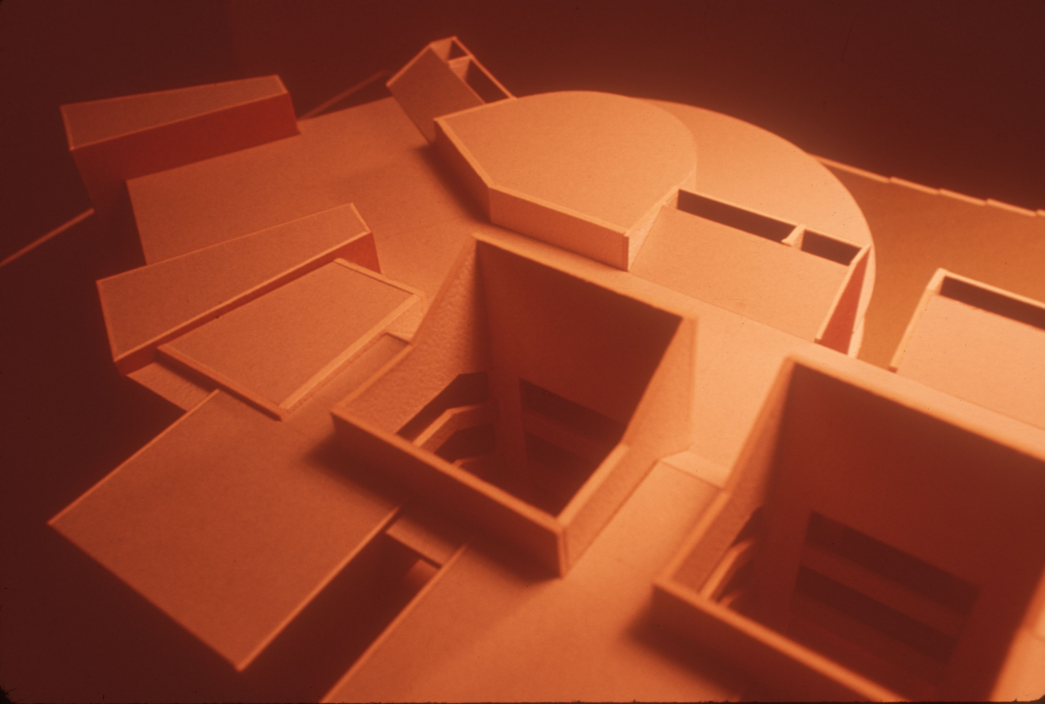


















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