PROCESS STUDIES

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Department of Architecture
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NOTES FROM THE EDITOR

PART 1: THE SENSE OF "BELONGING"

I am obsessed by process. In the course of the last twenty years of designing and building, and recording my failures and successes, it has seemed to me, more and more, that what governs the life in any part of the environment, is something, some character, which can hardly at all be put there by the processes which we today consider normal.

We may describe the best situation in the environment, as one where we experience emotional possession of the world, or "belonging." It is a state in which the fine adaptation between people and their buildings and gardens and streets is so subtle, and goes so deeply to the core of human experience, that the people who then live and work and play in that environment feel as if they belong there, as if it belongs to them, as if they are part of it, as if, like an old shoe, it is completely and utterly theirs.

Of course, since we are social creatures this belonging is almost never individual or idiosyncratic. It is a state in which the world, as we create it, has this quality of seeming to belong to us, *collectively*. It belongs to our *deeper* self, that self in which we are united with our fellow creatures. It is a state in which we recognize, with joy, each gate, and field, and road, and tree; each window, and roof and nook and cranny, as a friend.

Historically, this quality which allows us to possess the earth, comes about as a result of a long process — often years, and even centuries long. It is a

process in which minute adaptations, carried out gradually, create this mutual sense of belonging, between people and their buildings.

But in our world, the opportunity for this very long time span, needed in history to create such a sense of belonging, is simply not available. We live in a time where things move quickly; where society evolves at a very great speed; where people are highly mobile; where everything changes at great speed. Whatever process is needed to create this sense of "belonging" must therefore be something new. The old historical forms of process, which created this belongingness in historical society, will not do for us, and we must invent entirely new kinds of process which may do it, again, in some new form, but by entirely different means.

The problem is aggravated too, by the fact that those social processes which now exist, the processes of design, bidding, construction, financing, all work together to produce an environment in which this state of "belonging" quite conspicuously does *not* occur. *It is this problem, above all, which is responsible for the callous, mercenary, and indifferent environment which we experience around us most of the time.*

PART 2: THE ATELIER OF THE BUILDING PROCESS AREA

As a result of my concern with this problem, in the Fall of 1994, I launched a new section of the Building Process Area of Emphasis in the Department of Architecture at Berkeley. This section is called the atelier. The understanding in this atelier, was that students in the atelier would undertake real world projects, and would try, in real life, to

inject those aspects of life and harmony which they had previously learned in my lectures, and in other Building Process courses, *in actual projects in the world.*

My concern, in starting this new venture, was that students have, in the past, learned the intellectual and emotional side of this new architecture, but have been unable, once they reach the real world, to put it into practice, and have — too often — fallen back into established professional ways, simply because the new ways seem to be too hard to implement. The following public statement launched the atelier:

"During the last twenty five years, I have taught many generations of students, and given them a love for "living architecture", taught them what this means, and how their own designs may reflect this living quality. However, many of these students, when they reach the real world, end up unable to implement this quality — because the conditions in society today, and in architect's offices, do not permit it to occur.

"Thus the beautiful character of what students learn can become ultimately frustrating, because the profound issues and problems of implementation are not sufficiently well worked through during their time in school.

"I have decided now, that this subject is of such importance, that my design studio this year, and possibly in future years also, will place primary emphasis on implementation and realization of the concepts students are taught, in the real world, under the difficult conditions they will inevitably face in architects' offices, and in the world of business, banking, and modern urban planning.

"The intention of the class is therefore to enable each student to find a concrete way in which he/she can build real

projects, in the world, which have the life common in traditional times, and which call on the modifications which are described in THE NATURE OF ORDER.

"Class discussion of student work throughout the fall semester will be on process, not only content, and will focus on the issues needed to allow a real living architecture to be created. Students are required to do something real, where they can show real results. It may be better to undertake something very modest, and succeed, instead of attempting something large and failing.

"However, the concept of success and failure itself is not well understood, and the debate and clarification of what may stand as successes and failures, will be a vital part of the discussion.

"The entire emphasis of the atelier is on preparing students to go into the world with a reasonable expectation of being able to make living buildings, in the real world, and to succeed in this."

PART 3: PAPERS ON PROJECTS AND PROCESS

In the following papers, participants in the atelier describe real projects they have undertaken in 1994, and describe (and discuss) the essential *process* aspects of what they have done. In order to be accepted for publication in this journal, each paper has been required to meet the following conditions.

1. The paper describes an actual experience in a real project.

2. The paper analyzes the *process* aspects of the project, with special emphasis on those process aspects which, the author believes, are

responsible for bringing life to the project.

3. The paper contains an analysis of the success and failure of the project as it has been carried out, and evaluates the project from the point of view of the degree of life which it contains. Essentially, the paper asks to what extent the "belonging" referred to earlier, has been accomplished.

4. The paper defines those aspects of process or those processes which (in the author's opinion) have contributed to the project's life, and those which have not contributed or have contributed negatively to detract from the project's life.

5. The paper does all this within a context of understanding the shortcomings of existing process for projects of this type, and with a conscious intention to improve on the existing process, and with an effort to discuss and compare the "new" successful process with the old, less successful process.

It is my hope that the analysis provided by these papers, built up in small and large projects, over the next years, may repay us ultimately by increasing our understanding of what it really does take to bring life into the environment; and what practical steps, in future projects, may be expected to bring us this benefit on the large scale which is needed in the world.

PART 4: FOCUS ON EMPIRICAL RESULTS

In all cases, the focus of this journal is on empirical results; and this is brought out, at the editor's request, in all the papers.

The journal exists, because it is hoped that improved process, and process alone, can cure the present ills of the environment; and that, briefly stated, the "belonging" relation between people and their world, *can* only come about as a result of a new system of processes.

In the investigation of different processes, it is always necessary, therefore, to concentrate on the actual improvement of the environment. If a certain author proposes a particular process, as an improvement, our first and only question, before we declare our interest, must be "Have you done something which goes forward, makes progress, in achieving the "belonging" relation between people and their world?"

So, in every single paper, the authors are asked to explain what they have done, starting, almost from the outset, with a careful evaluation of this belonging relation, the extent to which it has been achieved, and with some empirical investigation or statement, which makes it reasonable for the reader to believe that it *has* been achieved, in some degree, more than in a typical other project of the same kind.

Only then, when we are clear what has been achieved, and that it does objectively attain more of this belonging relation, and exactly how and where it does so, can we then agree, as readers, that we are interested in the process which led to this. And indeed, at that point, we are clear in wanting the author(s) to tell us just which parts of the process, or which aspects of the process, in the authors' opinion, has done the most to achieve this greater belongingness in the world.

With this criterion as the central investigatory tool, there is a reasonable hope that over the long run, the studies started in this journal might gradually get us to a more reasonable world. In any case,

I believe these studies will gradually create tools which many people can use in their own projects to achieve a greater degree of human connection to the world, and a greater degree of attachment of the built world to human beings.

Christopher Alexander
Editor

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Learning to Build
Shaping Space with a Beautiful and Living Garden Wall

Daniel Kosak and Kathleen Smith

In their paper, Kosak and Smith take a very small example, the construction of a wall enclosing a tiny garden in Berkeley, and show how this process becomes significant, and, step by step, how they were able to make the wall valuable.

There is an appealing honesty in this paper. And what shines through, also, is the fact that they thoroughly enjoyed themselves while doing it. This quality of joy, as an accompaniment of work, is the vital ingredient in creation of a living architecture.

Introduction

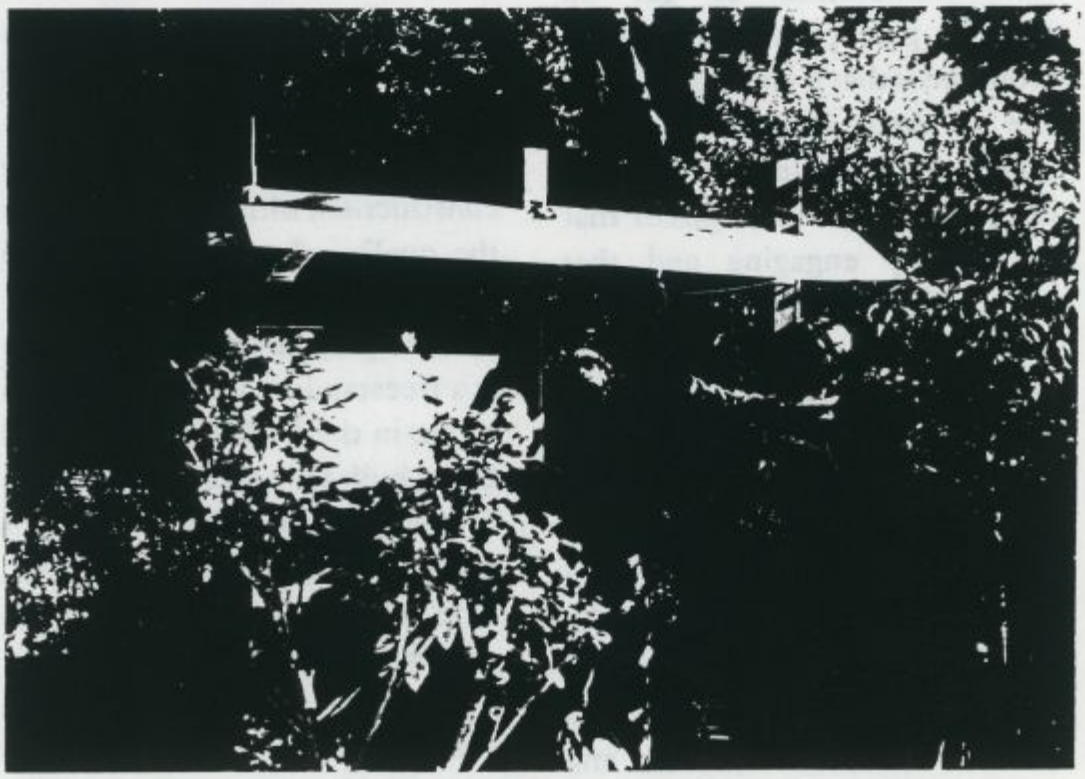
What makes positive space positive? What design tools are most effective for creating positive space? How can we create places in which people feel a deep sense of belonging and joy?

Too often, in modern society, these questions go unasked and unanswered. The result has been the death of true beauty and meaning in our environment. A new process of design and building may be the cure. As it is today, mainstream architectural practice discourages, even prevents, designers from engaging in the actual making of buildings. Because of this, a deep understanding of what makes a building or space come alive has been lost. The importance of the context of a site, the history and culture of communities, and the lives of the people affected by a building has been replaced by an increasing emphasis on style, image, and concept. The result is evident in our homes, neighborhoods, and cities which are often described by both architects and non-architects alike, as being impersonal, sterile, alienating, and lifeless. Builders,

too, no longer have the freedom to make decisions about how a building might go together, even though they are in closest contact with the materials and are in the best position to evaluate the life of the space as it evolves.

To remedy this, we present an alternative approach to architectural design and construction. This approach is based primarily on the understanding that the nature and structure of a building must emerge from the life and character of its site and its users, and that for this to happen in a profound way, it must evolve through a process of simultaneous and continuous design and construction. At its most fundamental level, this process seeks to create spaces that are alive and beautiful, that are deeply connected to the environment, and that are truly loved by people.

The most significant aspect of this process for us is its power to create just such environments. In the project we are working on, we



Testing the roof pitch & connections with the clients

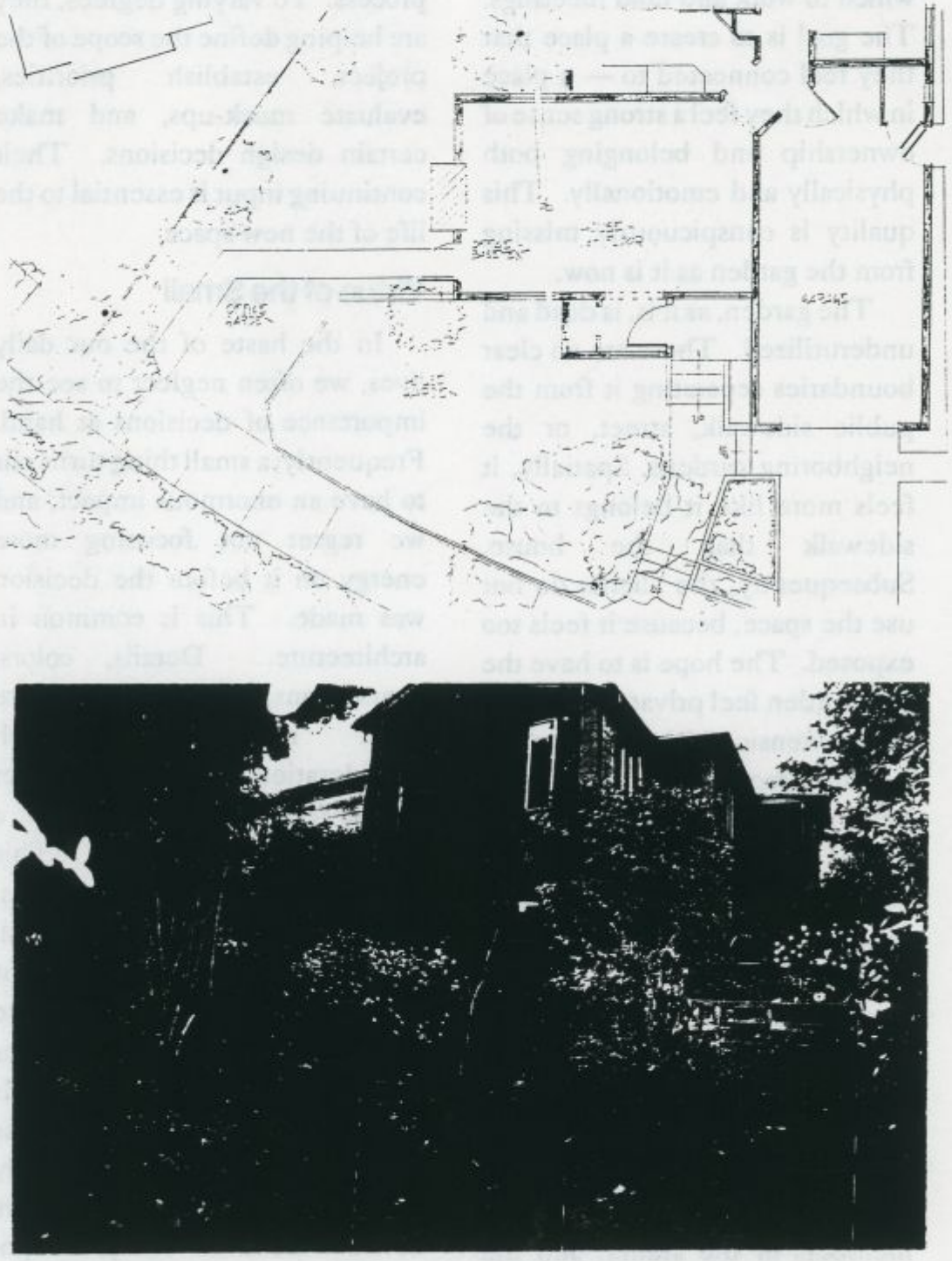
want to create a harmonious space, one that people feel a deep sense of belonging and connection in. This process gives us the ability to test design ideas in context in order to understand the real impact of our decisions on the space, so that we know what we are building is right for the site and the users. With this process, we are learning the importance, power, and joy of creating space in three dimensions. It is impossible to really know what a space feels like when it is viewed only in models or drawings. One has to work in three dimensions to get an accurate perception. What is so profound is that if one *does* work on site in three dimensions in an honest and humble way, then one *can* predictably create places that are deeply engaging and that possess the quality of belonging to place that we all seek. With this process, the power to create beauty is not left to chance or circumstances, but to us, the architects.

This realization — that one can consistently create beautiful places through the implementation of a specific process — is the inspiration and basis for this paper. Throughout the course of this paper, we will describe the project we are working on, its successes and failures to date, and the specific process aspects most responsible for each. We will, also, offer insights, suggestions, and warnings for applying this process to other projects.

The Project: A Dead Space in Need of Life

This is a relatively small project, but one which embraces the process we seek to describe and which brings to the surface many of the benefits and issues regarding how positive space can be created in a predictable manner and how designing in three dimensions, even during construction, ultimately enhances the quality of space and the way architects understand its creation.

The project under completion is a freestanding garden wall with a gate in the Berkeley Hills. It is being built for a small architecture firm operating out of the basement of the principal architect's home. The clients are interested in creating an entrance and transition from the much-used public sidewalk and street to the office, and a comfortable outdoor place in



Photograph and plan of the existing site. The door to the office can be seen to the left of the chimney

which to work and hold meetings. The goal is to create a place that they feel connected to — a place in which they feel a strong sense of ownership and belonging both physically and emotionally. This quality is conspicuously missing from the garden as it is now.

The garden, as it is, is dead and underutilized. There are no clear boundaries separating it from the public sidewalk, street, or the neighboring gardens. Spatially, it feels more like it belongs to the sidewalk than the house. Subsequently, the clients do not use the space, because it feels too exposed. The hope is to have the new garden feel private enough to be an extension of the office space, a second room in which to work. Since the office and its garden are part of the larger structure of the house and its garden, issues around privacy, enclosure, definition of spaces, and connection to the overall environment are also important.

Hajo, the principal client and homeowner; Masako, Hajo's wife and homeowner; Chris, Susan, and George, employees of the firm; members of the atelier; and the neighbor to the south are all playing important roles in the process. To varying degrees, they are helping define the scope of the project, establish priorities, evaluate mock-ups, and make certain design decisions. Their continuing input is essential to the life of the new space.

Virtue of the Small

In the haste of the our daily lives, we often neglect to see the importance of decisions at hand. Frequently, a small thing turns out to have an enormous impact, and we regret not focusing more energy on it before the decision was made. This is common in architecture. Details, colors, connections, and textures are often not given much consideration, even though impact on the feeling and character of a space may be significant. This happens with landscape elements, such as walls and benches, as well.

Architects typically do not put a lot of energy or care into the design and construction of fences or gates, if any at all. Garden walls are usually thought of as unimportant or just purely functional or decorative barriers between areas. In reality, though, a fence or wall is of great importance, because more than

Sketch by the principal client showing the larger context

being just an object in the landscape, it is a prime creator of the garden space. Along with the house, it helps define how that space feels and how it relates to the larger environment.

In our project, for example, the wall will serve as the primary boundary between the public and private realm and as the springboard for other projects which the clients have defined as necessary to the enhancement of the overall feeling and character of the house, office, and garden and their connection to the street and neighborhood. The projects they defined include an entrance gate to the main house, a second story addition or roof pitch change, the replacement of existing front garden fence, and the creation of a small builder's yard near the office.

Since the wall will be informing all future works, it has taken on added importance and difficulty. We know that whatever we build must occur within the context of the whole house and surrounding context, that it must work with and improve the existing structure and relationships, and leave clues about what will happen next on the site. The task is not only to create a beautiful, comfortable space to work in, but to create a

structure that ties the office, house, and larger context together while also clearly distinguishing each area. In short, we must create a beautiful, lovable, and functional space deeply rooted in and connected to its environment and the users.

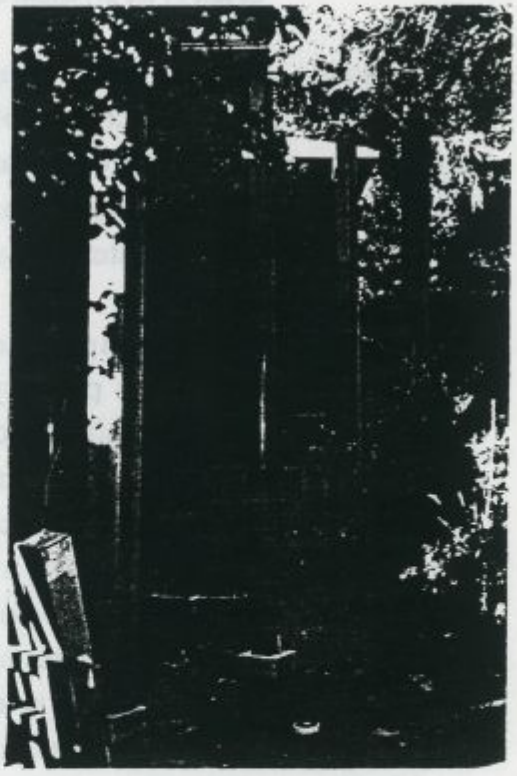
Evaluation of the Garden Wall

Typically in the world of architecture, evaluations of projects are based on whether or not they met budget and time constraints, identified with current trends, met energy standards, and receive acclaim in professional journals. While some of these considerations are necessary and good, none get to the basis of whether a design truly enhances the experience of a place or the lives of the users. An evaluation of this sort must probe more deeply into issues of human interaction with space.

At the point of writing this document, we do not have a complete project to evaluate. We can, however, evaluate the success of the results created so far in the form of on site mock-ups, the poured foundation, and the major structural elements as they exist in our work shop. To do so, we have used the judgments of the clients and members of the atelier. We have also made direct comparisons to a couple of other fences in the Berkeley Hills, placing emphasis on how space is shaped and created, rather than how nice they look.

▫ Responses to design tests

To get input from clients, we presented full-scale mock-ups of wall sections, connection tests, roof sections, and panel details to them on site. Members from the

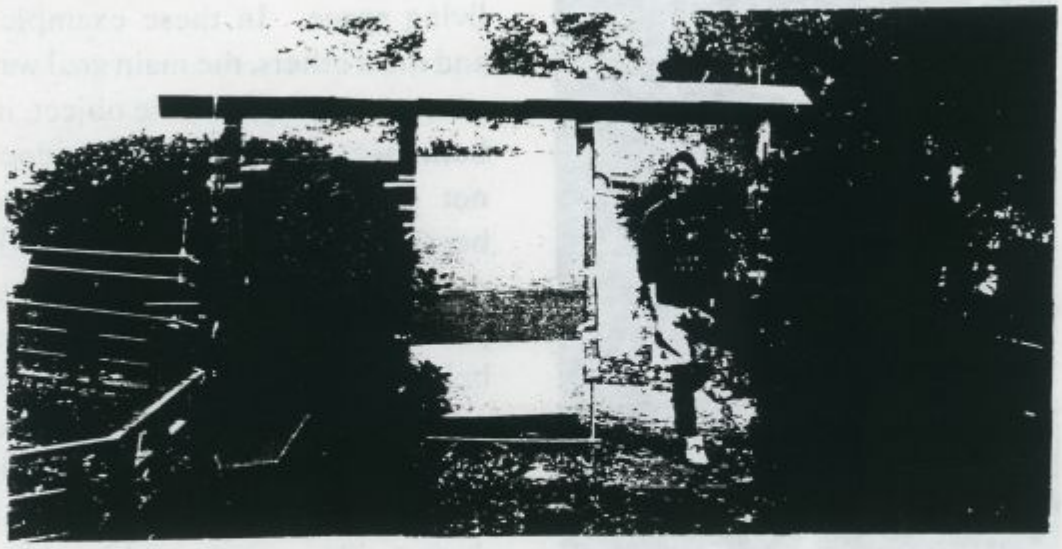


We tested base and post sizes with the clients; a mix of 5x5's and 4x4's was selected

atelier gave their input based on photos of the site and similar mock-ups done in the studio space. As all these people are experienced in this process and with describing things in terms of life and feeling and not personal preference, their input was a great benefit.

The reactions we received from people to our first three mock-ups were of discontent. The clients felt that none of them actually helped the space in a positive way. They still felt exposed and vulnerable to the street and sidewalk. The fourth attempt was dramatically better. Not only did it shape the space much differently, but it also felt very natural and calm to all. Even the neighbor came out to comment positively.

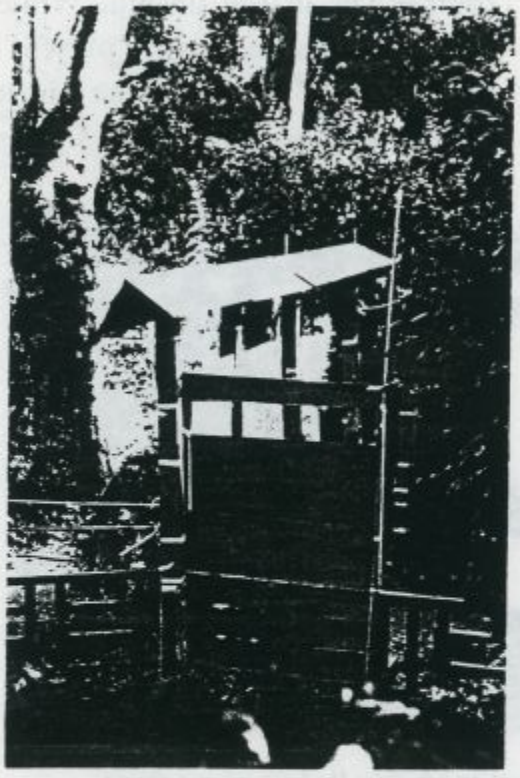
While testing the wall section patterns, there was a sincere and noticeable difference of reactions to the designs we developed. To one design, little comment came forth; people did not seem to identify with it in a meaningful way. The second design, which is not too dissimilar from the other in appearance, provoked much more intense reactions. Most people identified themselves with it — could actually feel aspects of themselves in the design. While comments ranged from "playful" to "elegant," perhaps the most descriptive was that the design is



Mock-up #4 created the best positive space and became the basis of our design

awkward in theory (i.e. plaster above light lattice work), but in reality, works very well.

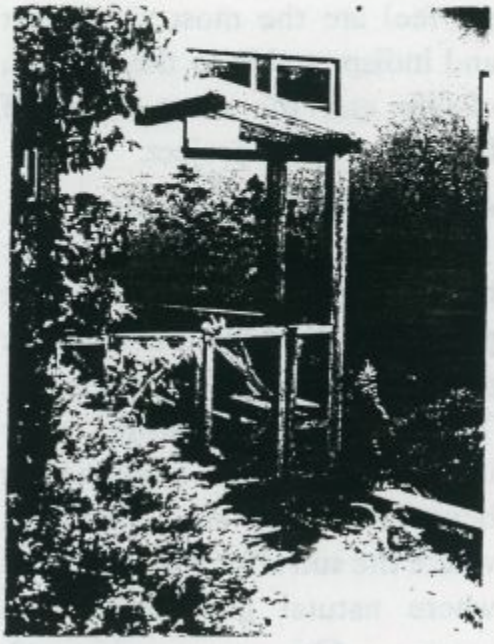
Because of the interactive process we employed, we were able to take this fence beyond just being a fence. A space is definitely being created there. From just the poured footings, one client expressed the feeling that space was changing, becoming more unified and calm. He, also, noted that the entry is more "special" and that it is "...not just a fence and gate, but has a real impact on the office." From across the street, Hajo finds that the fourth mock-up has a "strong and unifying presence in the largest whole." Comments like these are evidence that a greater level of belonging and life are being created.



Mock-up #4, as seen from the front porch

▫ Direct comparison

Below are two examples of existing fences and gates in the Berkeley Hills that we studied prior to starting our project. These were chosen as examples, because they seemed more successful than most others. Yet both seem to lack certain physical features or characteristics that are of key importance to creating a truly beautiful structure and defining a living space. In these examples and most others, the main goal was to create an object. The object, in both cases, is beautiful, but it does not really work to create space because it is not integrated with the surrounding environment in a positive. This shortcoming, we believe, is primarily a result of the process used to design and build the structures, specifically the lack experimentation and testing of design ideas and relationships between elements. We began our work with this analysis and are



Tea-house of the August Moon. Gate does not create a comfortable place for benches. Little variety in material and scale of members. No integration with surrounding environment

The White Picket Fence. Inadequate articluation of details and connections. Weak boundary. Little variety in material or scale of members.

making conscious efforts not to repeat the same mistakes. Our success is not yet discernible, but this will be part of our final evaluation.

It is our sincere desire of creating positive space and the realization of how to do that which is making this project successful. We want to create positive space, with a sense of integration, belonging, and harmony. The realization that through this process we can, is exhilarating. If we continue with this same level of determination for results and dedication to the process, our completed project will be a success.

Most Significant Process Aspects

It is evident from the reactions of the clients and others, and from the comparison of our project with others of a similar nature that we are succeeding in creating a place with real life and deep emotional presence. We are convinced that this is due to the process we are using, and most significantly to the three process aspects that we

describe below. But first we would like to briefly describe the overall process we are following.

Before we took a single step towards physically designing the wall and gate, we decided upon a fluid and coherent process that would prevent us from missing key elements of the site, program, and users' needs that would be crucial in arriving at a living space. This dynamic process of creating positive space through the integral understanding of each element of the project and its spacial relationship to other elements involves many aspects. A basic outline includes:

- Mapping Centers.
- Interviewing Users.
- Defining Largest Whole.
- Defining New Centers.
- Establishing General Shape.
- Determining Proportions.
- Finalizing Material Choices.
- Designing Details.

Several of these steps fall within larger categories of process principles or aspects. We would like to highlight the three process aspects — defining the largest whole, working in three dimensions, and direct integration of design and building — which we feel are the most significant and indispensable to the creation of life and the deep sense of belonging in our project.

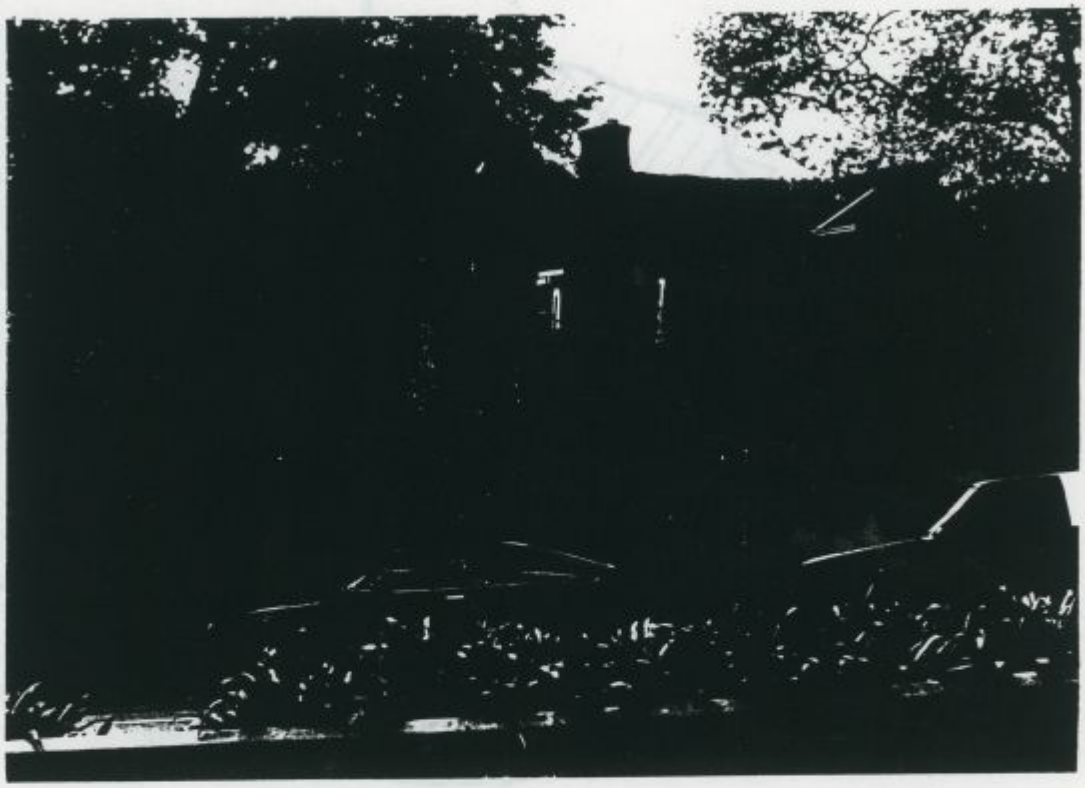
▪ Defining the largest whole

One must understand the life that is latent in the site and the people involved in order to create positive and harmonious space. To do so, one must consider, early in a project, the relationships between major site elements, where the sun affects the site, and where natural gathering places occur. One must also ask questions like: What are the naturally defined centers that exist within the context which have distinguished life? and Which centers are naturally stronger than others in the site? and What activities do not currently occur, but that need to occur to enrich the lives of the users? The answers to these questions are usually of such a profound and fundamental nature that they would be nearly the same for any person completing the exercise. The answers lie in the context, not the people answering the questions.

To address these questions in our project, we employed the techniques of mapping centers and interviewing users. We want

to be clear that these particular techniques go much deeper in exploration and understanding than the typical client programming meetings or site visits that most architects perform.

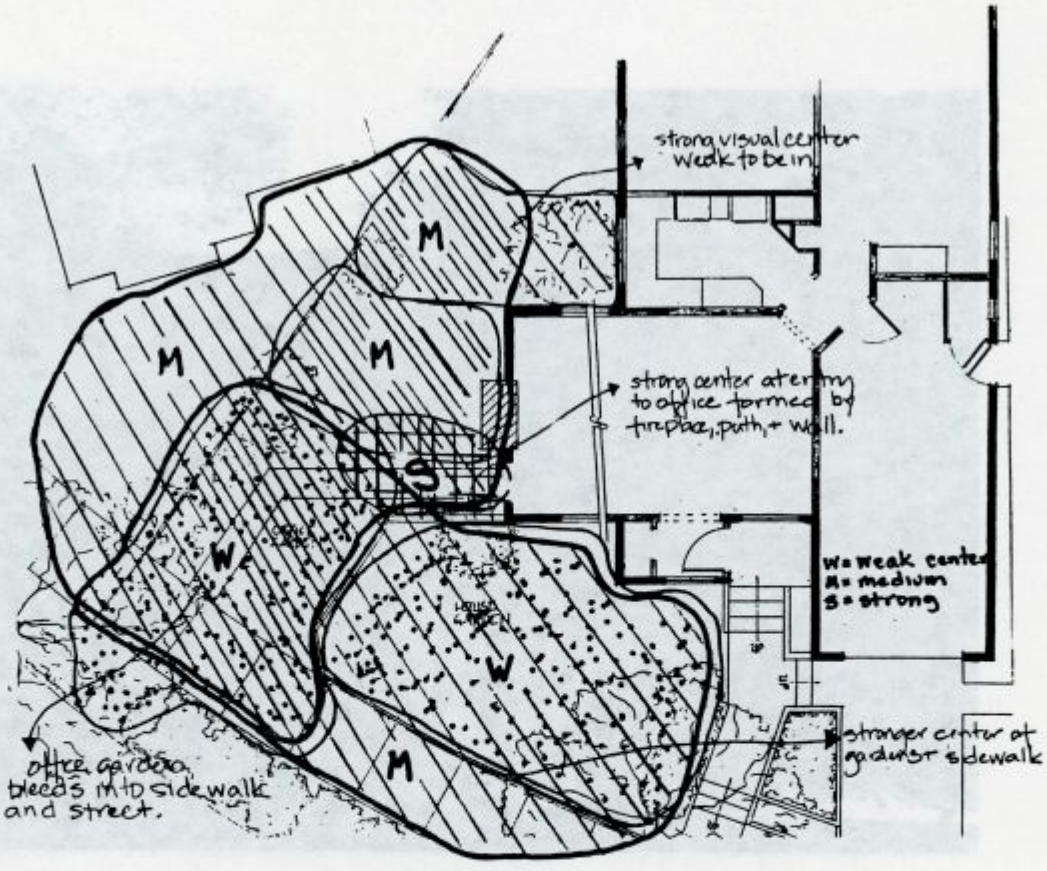
To begin, we spent several afternoons at the site, walking around it and sitting in it, taking notes, and conferring with the users. While we were doing this, we realized that to make the greatest impact, the wall needed to be felt positively from along and within the boundaries of the largest whole. To define the largest whole, we walked outside the site and through the site, up and down the sidewalk, and across the street. We determined from what vantage point an installation would impact the space. This fundamental understanding of the site from all vantage points



View from across the street showin the largestwhole impacted by the wall. The roof can be seen above the hedges.

became critical in determining how the wall could impact the largest whole. Below is a map we made to document our findings. It and our understanding of what it represents became a generative force in the making of the wall. We made it our objective to continually refer back to it throughout the process. It is important to note that a plan or drawing is not sufficient to gain even an elementary understanding of the space. The site must be experienced to be understood. Additionally, a "map of centers" does not necessarily need to be drawn out on paper, but merely understood by all participants.

Simultaneous to the process of mapping centers, we interviewed the clients to get a thorough understanding of how they use



Map of the existing major centers

and wish to use the site. We met the users on site, moved chairs around to possible work locations, held up bamboo poles and cardboard to signify possible barriers and eventually came to a shared vision. This shared vision has become essential in creating a space that facilitates future activities and enhance the lives of the clients.

In this process, it is important to identify the "real" objectives of the clients. Often, more superficial desires are expressed which do not get at the essence of what is needed in a space. In our project, the first thing some of the clients said they needed was a table and chairs to work at. With further discussion and insight, it came out that what was really needed was a sense of privacy and protection from the street and sidewalk, so the space would feel comfortable to be in. A table and chairs could not do this. A wall could.

Meeting with clients on site

▪ Working in three dimensions

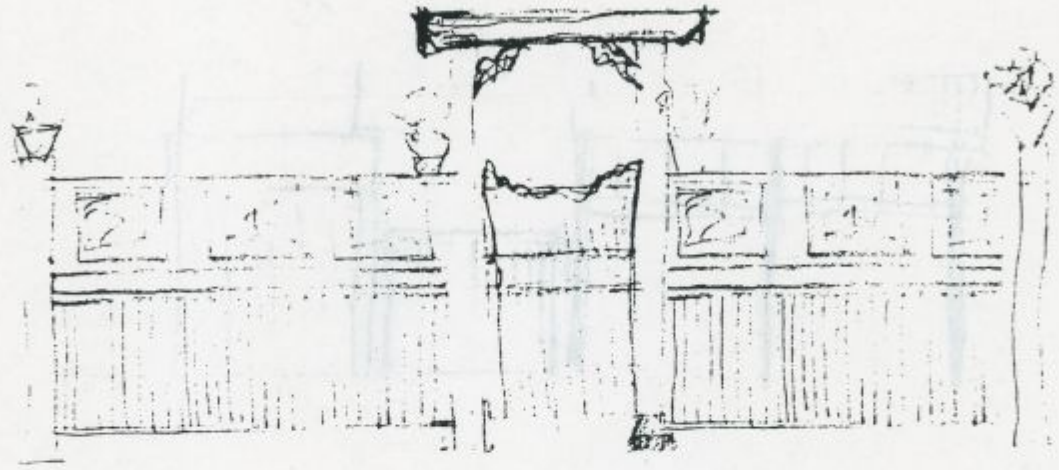
We all know that photos can never capture the true feeling of what it is like to really experience a place. Likewise drawings can not explain or adequately test what a space will feel like once it is built. The plan for a building may look good, but we do not experience space in plan, we experience it in three dimensions. Height, width, relationships or materials, and other spatial qualities can only truly be felt and understood in three dimensions.

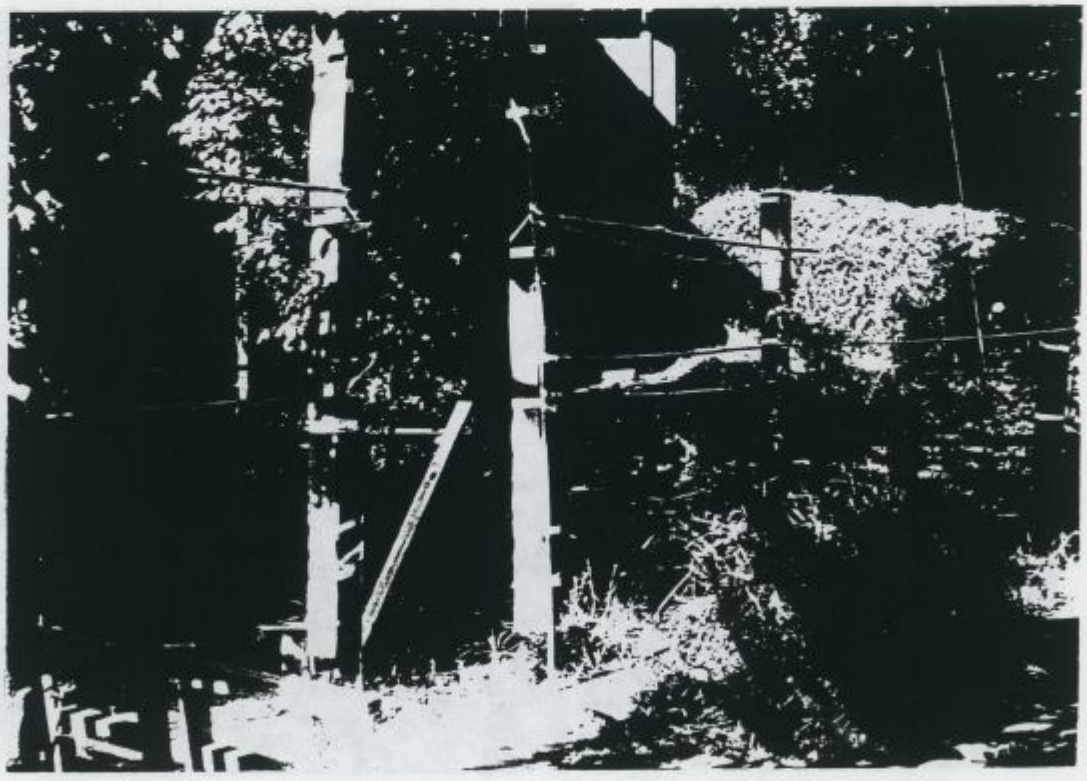
Realizing this is one of the most critical lessons we learned. Had we chosen to design this project in the typical fashion, using only drawings and, maybe, models, our results thus far would be of a profoundly different, and less harmonious, nature. The provision we have made for evaluating and enhancing the life and beauty of the space as it evolves is critical to our success. We realized this early on and have

been using full scale mock-ups and stakeouts on site and in our studio to experiment with, test, and refine design ideas. We would like to describe two of these experiences now.

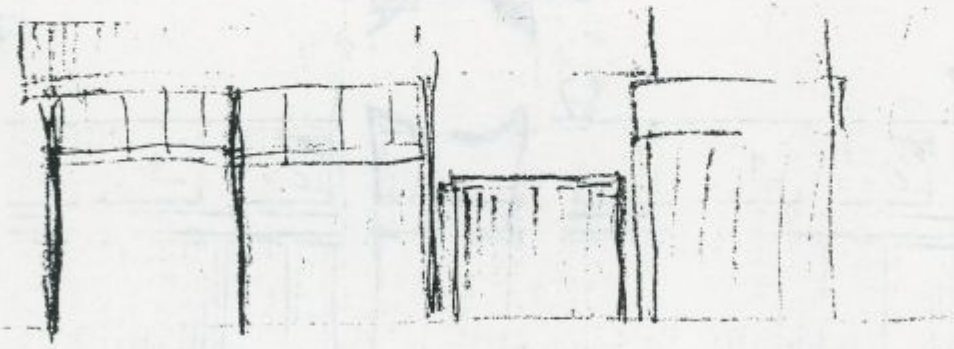
The first one involves experiments to determine the overall configuration or massing of the wall. Before setting pencil to paper, we used readily available and inexpensive materials like cardboard, bamboo poles, and string to get a sense of the relative location, height, and width of the wall. This could only be done on site with several iterations judged from various viewpoints. While doing this, we made a major discovery. Like any designer, we had preconceived notions of what this project might look like — a low semi-solid fence maybe three feet high — but while outlining that general shape (height, width, etc.) on site, we found that it did not define the space as we and the clients wanted. We tried three iterations of this general scheme making the fence higher and more solid each time. Although each mock-up had certain positive qualities, none created a strong sense of enclosure, privacy, or belonging. We tried sketching the third mock-up on paper to see what modifications might be made to bring it alive. We came up with several ideas on paper that were quite intriguing, but in execution still fell short of making positive space.

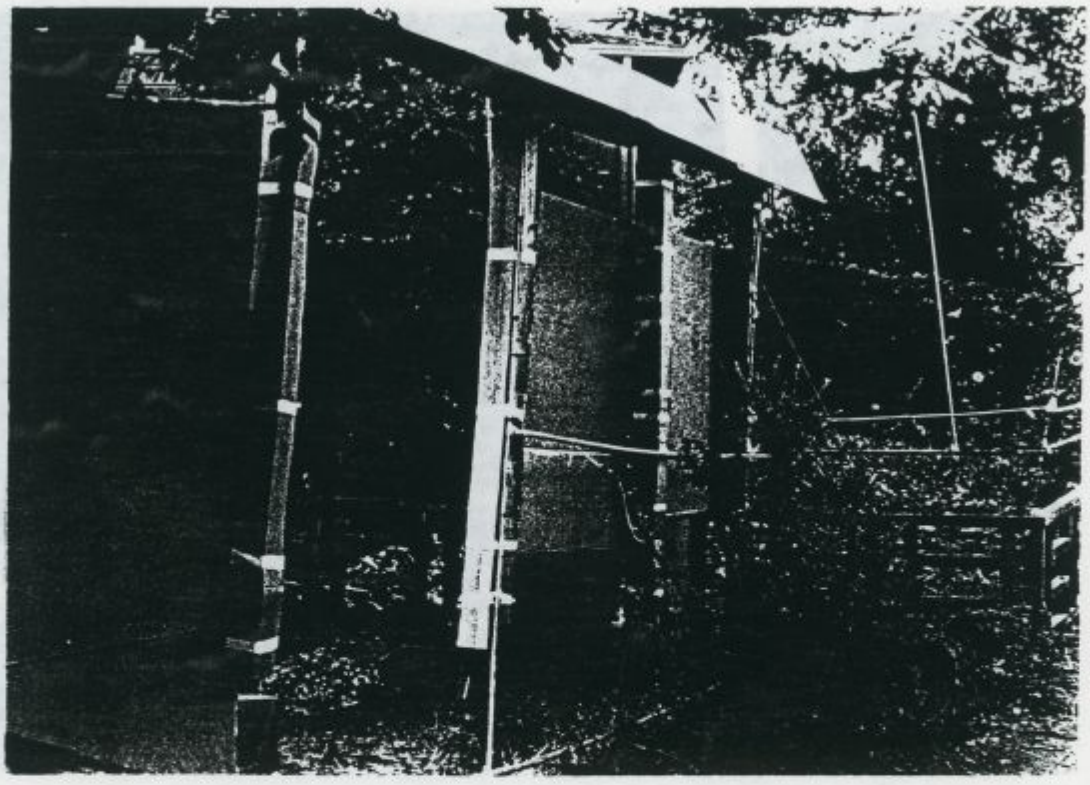
We had discussed the idea with the clients of having a much taller fence, more like a wall with a roof. We did a few sketches of this scheme, but were skeptical of its appropriateness. On paper it looked too big and too much like a barrier. We decided to try mocking it up anyway, just to see what would happen. As we built the mock-up, we could feel something happening. A space was forming in the garden and on the sidewalk that wasn't there before. The space began to breathe with life. Suddenly one felt distinction between spaces, yet connection too. We continued to modify this mock-up, adding two side walls and a bench, eventually arriving at the general shape and size that became the basis for our design. The realization that the structure needed to be an eight foot tall wall rather than a three foot tall fence could never have been made on paper or away from the site.





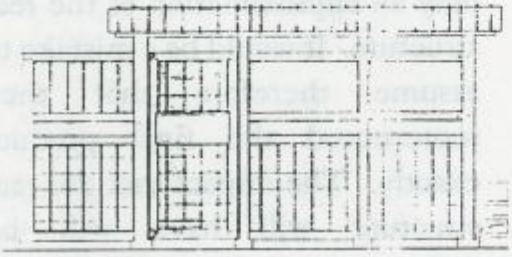
While the sketch looks quite nice, the mock-up did not create positive space in the garden



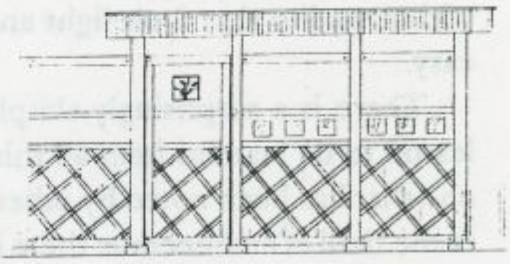


While this sketch felt quite awkward, the mock-up felt very natural and became the basis of our design.

Our second experience in this area happened when we were working on the design of the solid portions of the wall. We initially began with some thumbnail sketches, to test various design ideas and patterns. We did dozens of sketches eventually deciding on two which we wanted to mock-up on site with the clients. When we presented these two schemes in drawing to the clients, most preferred the first. (Both schemes can be seen in the sketches in



Drawing of scheme one.



Drawing of scheme two.

This photo shows the on-site comparison of the two panel designs. The one on the right provoked stronger feelings.

photos below.) When we presented the full-size panels of each holding them in place between two columns, we realized that the second scheme was the better choice. It succeeded in creating a solid boundary between the public and private realms, but with a quality that feels light and easy.

There is a surprisingly simple lesson to be learned from all this; one that has been noted by others in the field of architecture: there is no substitute for reality. Drawings simply do not and can not accurately describe the feeling or life of a space. You can make anything look good in drawings, but the site never lies. With this experience and understanding, we have made and will continue to make decisions about reveals, edge shaping, structural connections, and the like.

▪ Direct integration of design and building

The other critical lesson we learned through the implementation of this process was that a real sense of belonging is created in positive space, and positive space can only be created through the integration of design and construction. Even though we had done careful mock-ups before beginning to build and were confident of the choices we had made, there was no way to adequately mock-up certain elements or predict all circumstances. Mock-ups often do not use real materials and are only an approximation of the real structure. It would be a mistake to assume therefore that they represented the final product exactly. The impact that the real structure will have will be different, it may be subtle or it may be profound. Using a process of integrated design and construction allows one to gain a deeper understanding of the space and unfolding life and create a much more beautiful place because of it. We will describe two situations in which we found this to be true.

The first instance occurred after we had established the general shape, proportions, and structural system for the wall and were ready to start building the foundation. We designed the pier footings and began digging the holes and preparing for the concrete when, we noticed that the angle created between the wall we were building and an existing fence along the southern property

line was visibly less than ninety-degrees. We double-checked all of our measurements, and referred to our quarter-scale site plans, but found no errors. Somewhere something was not accurate, possibly in the original documents, or simply in the crudeness of the scale. The impact was unbelievably disturbing when quickly examined with cardboard panels held up to represent the wall. The angle which was perhaps 85 degrees, appeared to pinch the space in a way that detracted from its life and calm. This small aspect made the whole garden feel uneasy. Had a contractor been building this as per our drawings, the acuteness of the angle would have been devastating to the life of the space. Because we were building the structure we were able to see the error and correct it. We adjusted two of the foundation holes a couple inches. The space now feels relaxed and natural.

The second instance involves the roof. It is one of most dominant features of the wall, as evidenced in the accompanying photos. It covers over eleven feet of the wall and has a significant impact on the transition into the garden space and the largest whole. In beginning to design the roof, we found it necessary to experiment with its slope on site after a portion of the real wall was in place. A general slope was agreed upon in the studio, but the final, precise pitch had to be determined on site. Once there, we found that changing the slope even slightly one way or the other made an amazing difference on the feeling of the space. With the roof a little steeper, the gate seemed uninviting to the

Testing the roof pitch.

approaching pedestrian, but with it slightly more flat, its presence was significantly diminished in the largest whole. The balance was somewhere in the middle. This could never have been determined in drawings or away from the site. We had to experience the impact of the roof in real terms with enough of the real wall in place to see the impact on the life and feeling of the space. If we would have predetermined the slope and size in drawings and

Testing the shape of roof connections and details in context.

built it blindly, the emerging life, spirit, and richness of the space would have been significantly diminished.

This is by no means a complete description of the process we used. It is, instead, a description of the three process aspects — defining the largest whole, working in three dimensions, and the direct integration of design and building — which are contributing the most to the creation of life, feeling and sense of belonging in our project. If we continue using this process in the way we have been, we are confident the wall will be beautiful.

Applying This Process in Other Projects: Insights, Suggestions, and Warnings

As we get nearer to completion of this project, we have begun to reflect on the process and ask ourselves how we can apply it in other projects. We are fascinated by this process and are convinced that it produces far better results than the mainstream process of design and construction, but we want to know it can really work on large scale projects. Our garden wall project is small in scale, and, therefore, allows us certain freedoms that may not be available in larger projects. For instance, we are able to act as the architects, engineers, and contractors, and, as a result, are deeply connected to our work and have a real understanding of the implications of each decision that we make. Our project is much more alive and beautiful because of this. We worry, however about the applicability and effectiveness of this process when this level of involvement and control is not possible, as is the case in many larger scale projects.

We have been asking ourselves many difficult questions about how we might complete future works using this process: How do you make the process more cost and time effective? How do you ensure the necessary level of control over the project? How do you work with contractors who are unfamiliar with the process and want to do things 'business as usual'? How do you work with clients who are unfamiliar with the process? What do you do if the site is not easily accessible? As young architects, how do we find a job with someone else to get the experience we need and still use this process?

Although, these questions and others have been plaguing us, we are confident that answers do exist and that it *is* worthwhile to find them. No other process we have encountered seems to have the power that this one does to consistently create remarkably beautiful and wholesome places. In a world of deteriorating beauty in the built environment, this fact makes the exploration and development of this process not only worthwhile, but of the utmost importance.

▫ Critical factors for success

Even though this process is relatively new to us and we have many questions, we are learning a lot from it and have begun to develop an understanding of what some of the critical factors to the success of a project are. The list we have compiled is by no means complete. It is simply our beginning insights in to what architects need to have in order to be successful in their work at creating "living" environments. Although, in a few places we give examples, for the most part, we have not tried to explain specifically how to achieve each condition. This is because the circumstances of each project are different and warrant strategies specific to that situation, and because, in some cases, we simply do not know how. Regardless of the method used, if one can successfully achieve even some of these conditions, the quality of the environment being created will be greatly enhanced.

To be successful, an architect needs to have:

- Intimate involvement with the site in order to understand its life and connection to the surrounding context.
- Involvement of the users, in as many of the phases of a project as possible, in order to understand their real needs

Users involved in choosing post sizes

and their relationship to the site. (Ways to achieve this include meeting with them on site, doing mock-ups with them, etc.)

- Clear understanding of the largest whole (i.e. the largest area that the project impacts) and what aspects of the site and the project are most important to the existing and desired life.
- Ways to experiment with and test all scales of design ideas, in order to understand the impact of each decision in three dimensions. (Mock-ups and stake-outs are one way of providing the empirical evidence one needs to know what he is doing is enhancing the life of the space. Experiencing it in three dimensions one can tell immediately how it makes one feel.)
- Method for honestly evaluating experiments. (This includes getting and assimilating input from the clients, users, and others.)
- System for prioritizing decisions or an order of operations which acknowledges the decisions or aspects of the project that have the most significant impact and therefore warrant the most attention. (This system needs

Testing roof connections on site with the actual posts in place. Experiencing it in this way we were able to understand its impact on the feeling of the space

to ensure that valuable time is not being spent on less critical decisions and that energy is always being focused on the element or decision which, at that moment, has the largest impact on the life of the project. It is, also, important to keep in mind that the importance of a decision does not necessarily correlate to the size of the element in question. It is possible for a small detail, such as a tile, to be very important to the feeling and life of a space.)

- Ability to make design decisions and changes and experiment with construction techniques directly on site during construction. (In our project, this was achieved because we were the builders. In other situations, a special contract with the contractor allowing for such control may work.)
- Responsibility for the completion, success, and for life of the project. (This point is of the utmost importance to the success of a project. It is only with a sense of responsibility for the whole project from start to finish that the freedom and control to create life will be available.)
- Belief that one can really improve the world, that the creation of real beauty and harmony in the built environment is possible.
- Trust in the process and openness to ideas and experimentation. (In our project, it was our openness to experimentation that allowed us to arrive at the design for the wall as we described earlier.)
- Trust in self and ability to put spirit into the work. (This includes taking ownership of the project in an emotional sense.)

As we said, these are only general conditions which we feel need to be met in order to have a successful project. How one fulfills these conditions depend on the situation. Remember, though,, these are not just lofty goals. they are part of a concrete for achieving quality, life, and feeling in the built environment. We have described some aspects of this process,such as defining the largest whole, working in three dimensions, and integrating design and construction. There are many more aspects and steps.

Their exact application will change depending on the situation, but the goal, always, is to enhance the life present in the environment and the people involved.

A special warning

Before we end, we want to offer a special warning about using this process. It is not at all uncommon for architects using this process to get to a point in which they become inefficient or unproductive. This happens for two reasons fear and over emphasis of details, or in more crude terms, dawdling. The fear and dawdling both tend to arise out of the profound realization that this process does really work, that working in three dimensions on site does make a tangible difference in the quality of a space, that even small changes can have an impact on the feeling and life of a space, and that we, as designers, have the ability to predictably create positive and living environments. This is both an exhilarating and terrifying realization, that often can temporarily impede progress.

In our project, we experienced both phenomena. At one point, we spent nearly two weeks trying to decide upon the materials and secondary structure of our wall. Everything seemed to depend on everything else, and we were afraid of ruining the positive quality and feeling we had already created, so we didn't do anything.

At another point in our project, we were slowed down by our excitement of experimenting with ideas, materials, and connections. We got so caught up in doing tests that we didn't get to building the wall until two-thirds of the way through the project's budgeted time. Using this process, there is a temptation to get lost in the joy of seeing the impact of your ideas in three dimensions. We recommend against it. It is, ultimately, much more satisfying and enlightening to actually build the project and see your ideas come to life on site with real materials.

These are things we know we did wrong and would be cautious of in our next project. We offer them here as warnings to others beginning to use this process.

Conclusion

It is important to keep in mind that the process steps we described earlier are part of a

whole process. They must occur within the framework of a larger vision of the quality and feeling that one wants to create in an environment. As well, using this process is not necessarily a guarantee that the resulting project will be profound. But in our experience, there is no other process which possesses a greater facility for the creation of beauty, the enhancement of life, and the transformation of person and space. Every time we use this process we get better results, and every time we learn something.

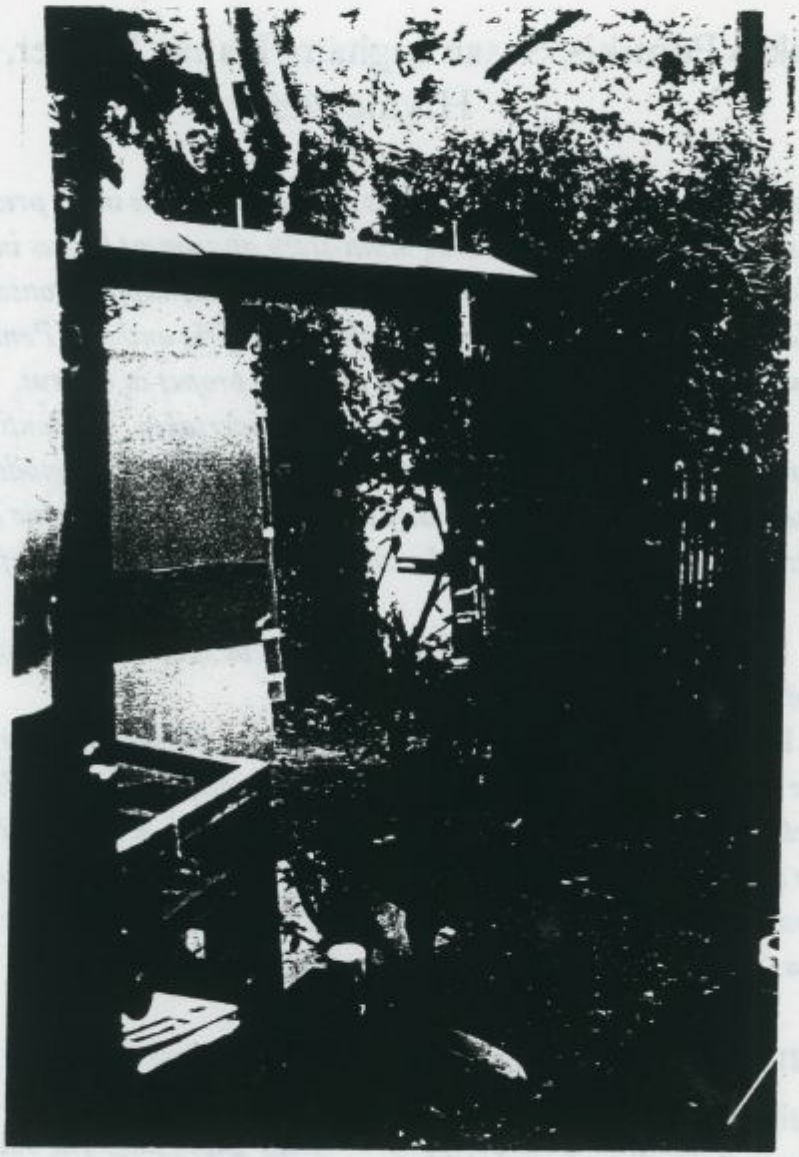
The most important thing we are gaining from the implementation of this process is an awareness of the importance of positive space creation. As architects, we are not merely creating objects in space, but space for human activity and enjoyment. In our project, it is not just the wall that the users feel good about, but the space that is being shaped by the wall. Physically representing the wall on site in mock-ups was an extremely effective method for understanding its impact on the space and ensuring the creation of a living place.

This simple, yet rigorous approach to the act of making is deeply rooted in emotion and spirit. It inspires one to be open to a variety of appropriate influences and experiment with the life of a space. With personal and humble attention given to each element, the life of places is significantly improved, and those involved in the process experience the joy of making these profound changes happen.

The steps we undertook in this process demonstrate that there is no substitute for reality. No amount of drawing would have told us the information we gained through the physical experiments we conducted on site. The creation of truly living environments is immensely joyous work and quite liberating from the rhetoric of contemporary practice.

The primary objective is to create and enhance the larger centers of the site and the structure. Trust what you learned from the mock-ups and decisions you have already made, and build on them to create life and feeling in your project. Life and feeling come from finding the latent beauty in what already exists and bringing it out with what you build. To be truly successful, that is what our project must do at

every stage. We can not be afraid of this. If we are true to the process, our hearts, and our feelings, and take things one step at a time as they come, the space will come alive.



A New Apartment Building Process Construction Simulation of an Apartment Building in Cyprus

Kyriakos Pontikis, Susan Ingham, Danna Lerner, Andrew Hryniewicz

This paper, one of the most ambitious in scope and scale in the present volume, tries to set out a process for building multi-story apartment houses in such a way that subtle adaptations needed to create "belonging" can happen, consecutively and dynamically, during the construction process. One of the authors (Pontikis) has the opportunity to undertake such a process in a real project in Cyprus.

The work described in this paper, and undertaken by Pontikis and his colleagues, is a simulation in which they built a 1:12 full size model of such an apartment building, in order to study the effectiveness of dynamic changes and adjustments, undertaken during the construction process, and to find out two things:

(1) Whether it is true that the building can be made harmonious and well adapted, by such a dynamic process.

(2) Which kinds of dynamic steps and processes, during the construction, will play the most effective and most significant role in getting good results.

I believe that the second of these two questions has been answered successfully, and the answers helpfully discussed and analyzed. It seems to me that the first of these two questions has not yet been answered: thus leaving the answers to the second question, so far less powerful than they may ultimately be.

Apartment Visions

Kyriakos: *"It's an apartment building with small roofs and stepped back terraces overlooking the street. Each apartment house has something special which makes it unique,; a beautiful bay window, a big porch, a trellis with vines. The building has an open entrance to the street and a small communal outdoor space with a rose*

garden and a small fountain. The parking is away from this sunny outdoor space. An open stair provides access to my apartment house. A beautiful entrance door opens into the heart of the apartment which is a big room with light from both sides, thick walls with built-in furniture, and a fireplace. It is a comfortable and cozy place where the family spends time together. This area is adjacent to the dinning area and kitchen, which has colorful tiles and open shelves. The terrace of my house is a small outdoor room, big enough to accommodate a small table and chairs. It has a trellis with jasmine and pots with colorful flowers. The bedrooms are small, with tall windows and doors opening into small balconies. Throughout the apartment there are small things which are made with love; a flower box, bookshelves, a window seat. This apartment house belongs to me and I call it 'home'. "

Susan: "*I can imagine living in an apartment that is sunny and warm, where I can look out a window and see the larger world around me: trees, green areas, people, and the city. My apartment would be high up, about three stories off the ground, with an outdoor area where I could put a table and chairs, and plant some flowers and vegetables. My apartment would have its own entrance, and the path to the entrance would pass through a gate, into a common outdoor area on the ground floor, then up a narrow flight of stairs to a common porch. A door opens onto the porch, which leads to an interior flight of stairs, ending at a small landing with a window, a bench, and the front door to my apartment. The interior of my apartment would have two small bedrooms, a sunny kitchen and eating area with a large table, and a living room with lots of bookcases and two work alcoves. The apartment building itself would have a common outdoor and indoor place for gatherings, cook-outs, shared facilities and equipment, and a place for guests to stay. Shops would occupy the ground floor. The apartments in the building would be a variety of sizes and shapes, depending on their placement in the building.*"

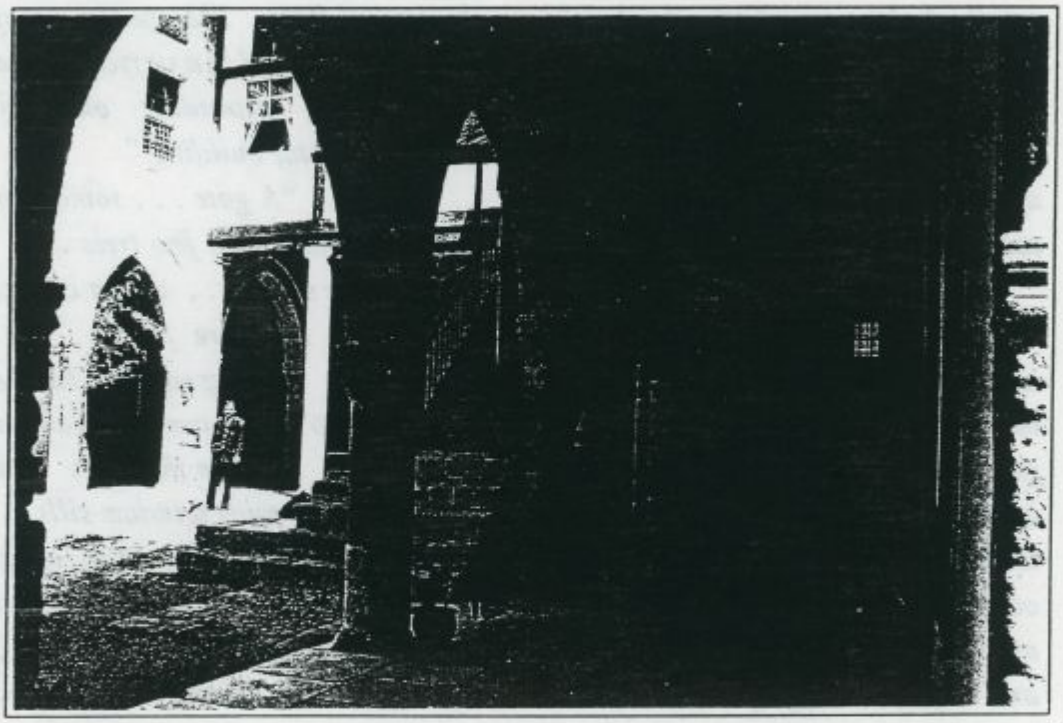
Danna: "*A gate . . . some steps under the shade of a few trees . . . I walk up the stairs . . . warm colored tiles under my bare feet . . . a courtyard, two wooden benches 'warming up' in the sun . . . A simple wide door . . . I open the door. Low windows . . . wide window sills . . . a room of warm light. an eating alcove . . . many books . . . a thick wooden dinning table . . . a room of obscure shades. A view of the rooms .*

. . a view of the street . . . a breeze — the terrace — my guest room for strangers."

Andrew: *"A street lined with trees, small front gardens, 3 to 4 storey buildings . . . small shops, cafes, and restaurants a few blocks away. . . a path down the side, glimpses of a garden in the back slumbering in the sun. . . a door with small glass panes . . . a hall with a dark tiled floor. . . stairs winding up past small windows and front doors . . . at the top, a window looking over trees and rooftops, a solid feeling door . . . inside, a wide hallway with bookshelves, doors and openings . . . a window seat at the end of the hall. . . a large kitchen with a fireplace and a heavy wooden table and chairs . . . a sunny terrace with planters around the edge full of herbs, plants and vegetables . . a small library with sofas and bookshelves . . . two small bedrooms each with a big closet . . . a store-room/workroom . . . a sunny bathroom.*

Apartment Buildings Today: Design Separated From Construction.

Our goal in this project is to make an apartment building that is full of feeling and life, a building that you like, where you feel very comfortable and happy to live in. A building that you don't want to



move from or, if you do, you remember it for years to come like an old friend from another time and place. A building that, as you pass by it, you want to live in it or wonder what it would be like to live in it. Hopefully, we've all lived in or at least seen buildings like this.

Unfortunately, most of the apartment buildings now being built do not have these qualities. At their best, they have a full complement of "features," "a good design," and a veneer of expensive finishes, materials, and "treatments." At their worst, they are grim little boxes piled up into the sky. It is rare to find the kind of graceful adaptation, richness and warmth typical of traditional buildings. In either case, they are mechanically and repetitively produced, through a process that sharply divides itself between the design and the construction of the building. This division has the following results:

Once the plans are finished, it is assumed that the "design" is finished. There is no need to question, adapt or improve the building as it is being built. In fact, to do so is seen as redundant, inefficient or extravagant.

Typical Contemporary Apartment

The construction is done in a mechanical and abstract fashion. Making the building is split into particular operations — placing steel, building forms, pouring concrete, etc. — which are applied wholesale to as much of the building as is efficient to do so. The emphasis is on the quantity of output, rather than its quality, coherence, or on the development of "wholes" within the building.

Construction changes are time and cost consuming, and are strictly avoided.

Creating A Beautiful Apartment Building

Integrating design and construction.To resolve these problems, we propose a unified building process where design and construction are interwoven at each stage into a series of operations whose main goal is the creation of a beautiful building entity. This process is shaped by the following guidelines:

- **Guided by feelings.**

The aim of the process is to create buildings with life, full of feeling. No matter what step you

are working on, from the layout of the courtyard to setting a window in a wall or a tile in a floor, you are asking yourself "what is the impact of this step on the whole, is it doing as much as it can to bring life and feeling to this place, do I really like it, deeply, in myself?"

▪ Creating "wholes."

The construction operations are set up around the sequential creation and evolution of wholes. Operations are organized so that you are always working on, thinking about, and developing "some- thing" to a certain level before developing the next "something" to a similar level of completion. Thus, you are always working on a whole like the courtyard, the second floor apartment, or a particular room rather than in an assembly line fashion where you are working on "all the second floor walls" or "all the porch doors."

▪ Adjusting.

Design and construction are unified and interwoven in each construction operation. While the gross characteristics of the building have been designed before beginning construction, fine-tuning, development, and invention are an integral and essential part of building. Thus, the process provides the freedom to adjust and modify the building form during construction in order to achieve the highest degree of life possible.

▪ Directing the flow of time and money.

In order for the interweaving of design and construction to take place, this process requires the architect to manage the construction of the building. A major aspect of this management is the ability to re-direct or change the flow of work and materials according to the evolving opportunities, feeling and character of the building while staying within the budget. Developing and administering the techniques that will accomplish this are a major part of the work in this process.

Construction Simulation

We studied this integrated process through the simulated construction of an apartment building in Cyprus. Using real materials, we built a model at 1:12.5 scale, and followed a sequence of operations designed to integrate and balance design

and construction. The major questions posed at the outset of this construction simulation were:

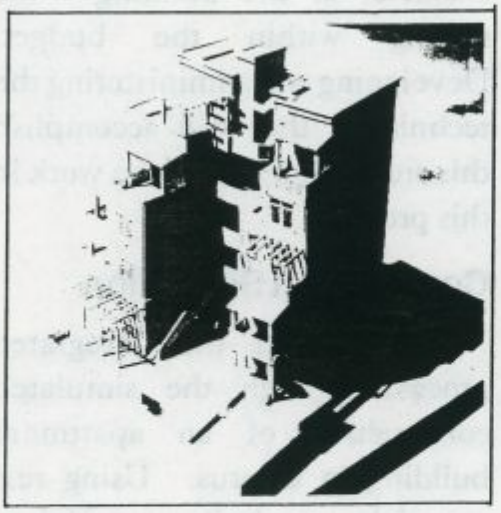
a.) What are the essential changes which need to take place during construction for the building to come "alive" and create a feeling of "belonging" in its users?

b.) What is the impact of these changes on the construction time and cost?

c.) What are the construction management techniques suited to this integrated process so that the proposed changes do not cause time delays and cost overruns?

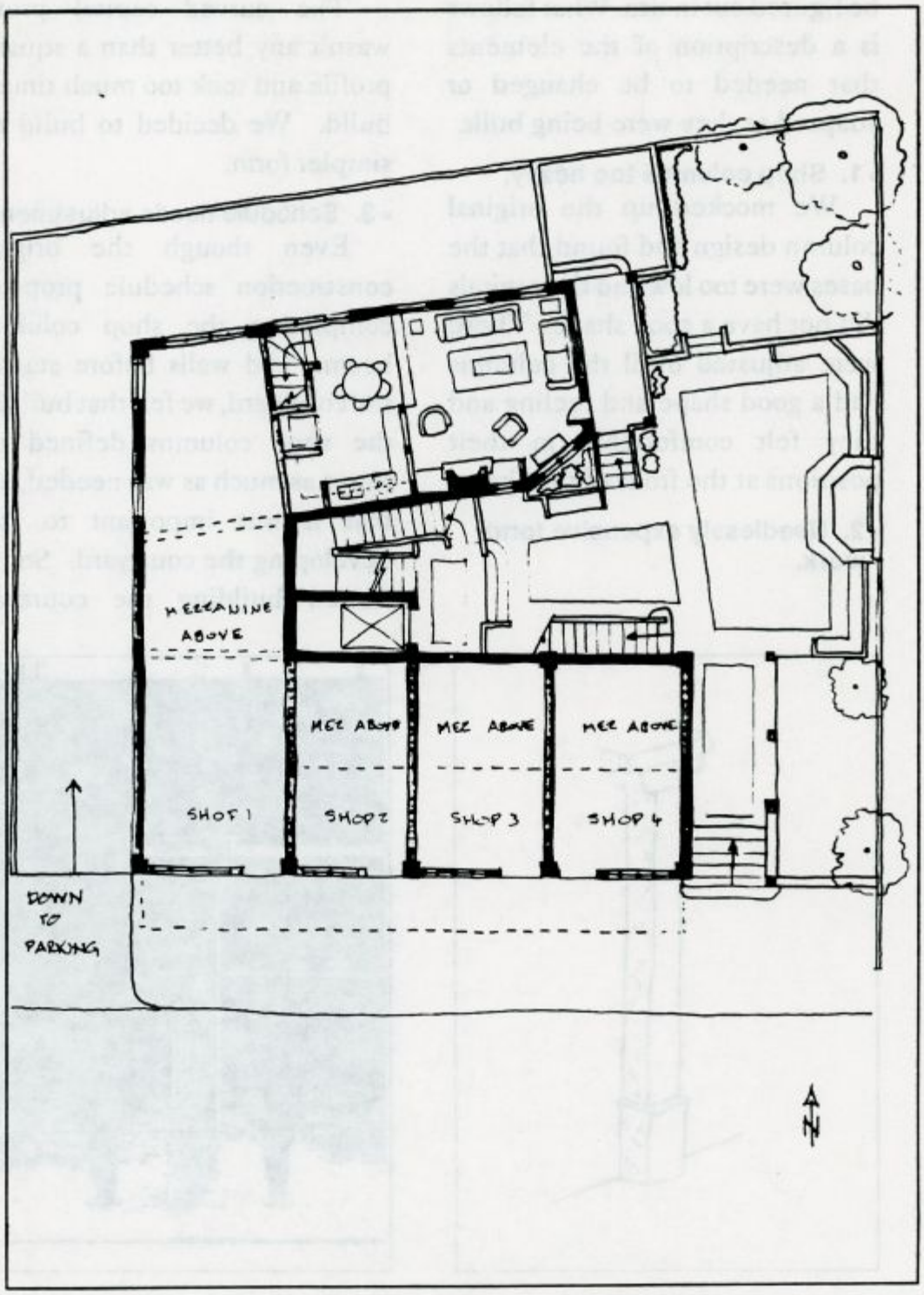
Changes During Construction

Before and after building any element, we would quickly check how it felt and how it related to what had been and was going to be built. In some instances the "original" element, what was on the plans, felt right. Sometimes it didn't feel right and we would have to figure out something to correct it. Sometimes we started knowing the plans didn't have a solution and that it would have to



Study Model of Building

Study Model of Building



Entry Level Plan of Apartment Building

be figured out in situ. What follows is a description of the elements that needed to be changed or adapted as they were being built.

▫ 1. Shop columns too heavy.

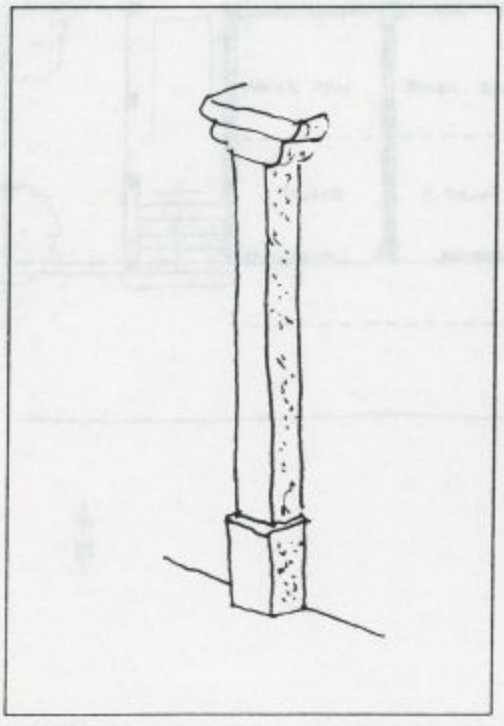
We mocked up the original column design and found that the bases were too low and the capitals did not have a good shape. These were adjusted until the columns had a good shape and feeling and they felt comfortable in their positions at the front of the shops.

▫ 2. Needlessly expensive form work.

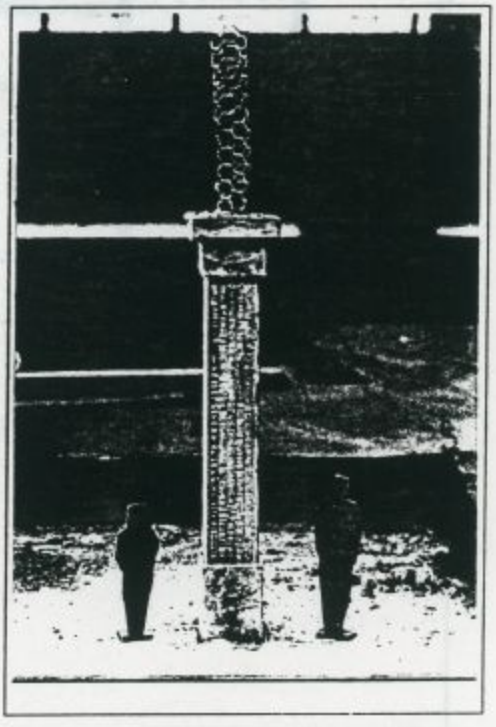
The curved capital profile wasn't any better than a squared profile and took too much time to build. We decided to build the simpler form.

▫ 3. Schedule needs adjustment.

Even though the original construction schedule proposed completing the shop columns, beams, and walls before starting the courtyard, we felt that building the shop columns defined the shops as much as was needed, and that it was important to start developing the courtyard. So, we started building the courtyard



Original column



Revised column

earlier in the sequence than originally planned.

▪ 4. Courtyard entrance too high.

We poured the main courtyard slab and entrance at the same level. We realized that the entrance would have been more comfortable if it was at a level between the street and the courtyard. This was a mistake we couldn't afford to correct.

▪ 5. Apartment column in wrong place.

The garage structure wasn't actually built but we assumed that we would follow its layout when we placed the upper level columns. When we placed the apartment columns, one corner of the apartment had a shallow, uncomfortable angle so we moved the column to make the corner deeper and more enclosed feeling. We assumed that we would have caught that when we laid out the footings and extrapolated back to that step. This move also

Courtyard Slab and Entrance

strengthened the shape of the central courtyard.

▪ 6. Apartment entry and floor level too high.

The original floor level felt too distant or detached from the courtyard and we lowered it 17cm.

▪ 7. Apartment entry stairs divide courtyard.

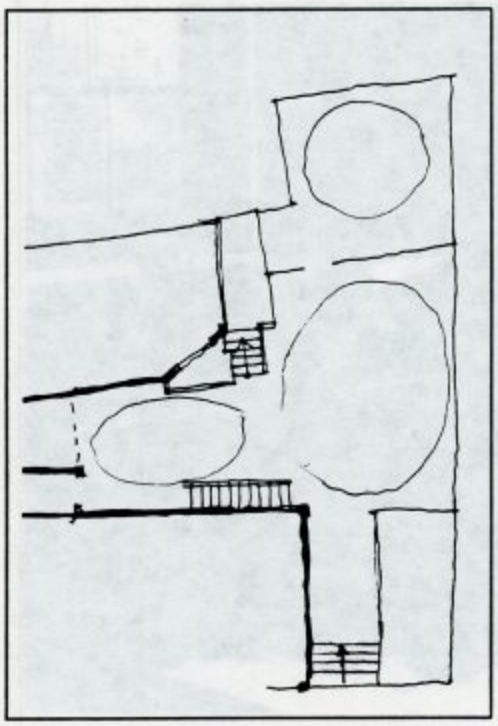
The entry stairs cut the main courtyard space into two awkward spaces and the stairs felt very exposed. We moved the stairs to the front of the porch and turned them 90 degs. This made the entrance feel more private and the courtyard shape and enclosure became much stronger.

▪ 8. Entrance porch too narrow.

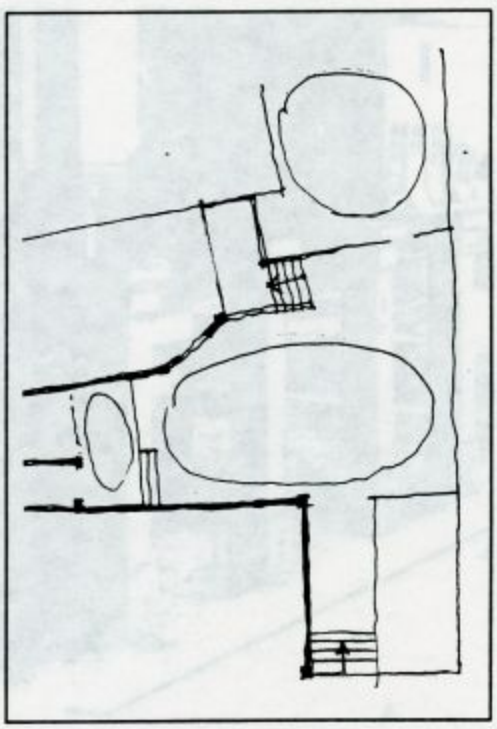
The porch felt narrow and cramped and we widened it 35 cm. until it felt right.

▪ 9. Base story columns not unified.

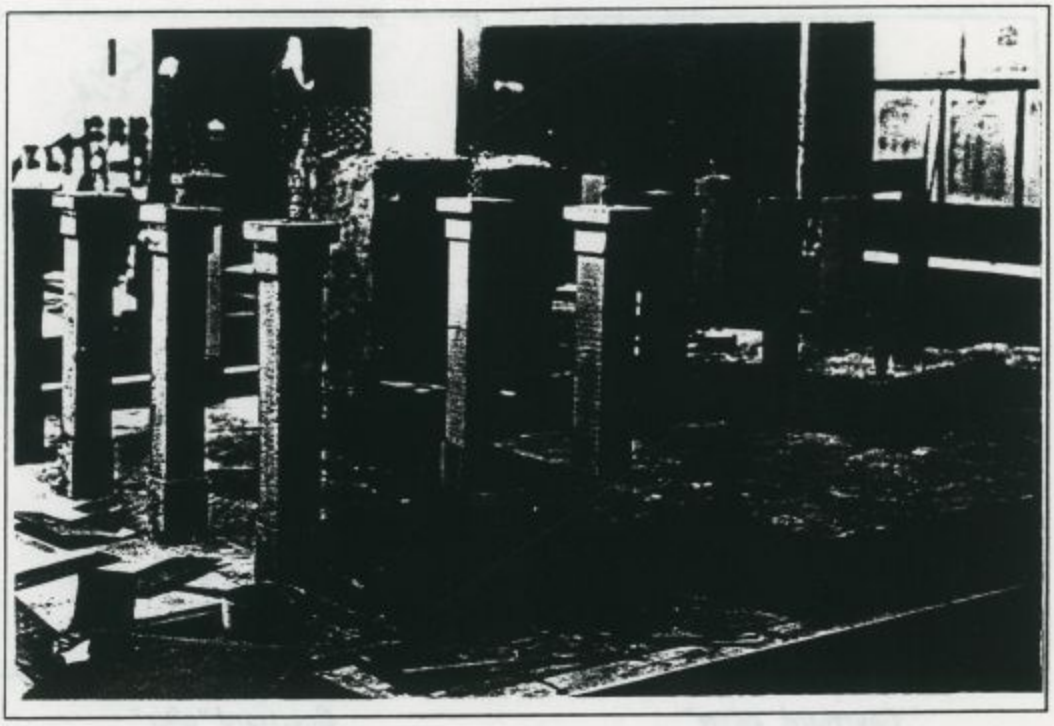
We made the remaining apartment columns a uniform 80cm x 30cm and gave them capital dimensions and details that matched the shop columns in order to make things feel connected and to make a strong



"Original" Stair



Revised stairs as built



Base story columns

base and family of columns for building.

▫ 10. Columns built without care.

We built two columns without checking their size and capital details. They were so disturbing they had to be re-built.

(From this point, work continued simultaneously on the apartment, shops, and courtyard, although it is grouped somewhat in the presentation.)

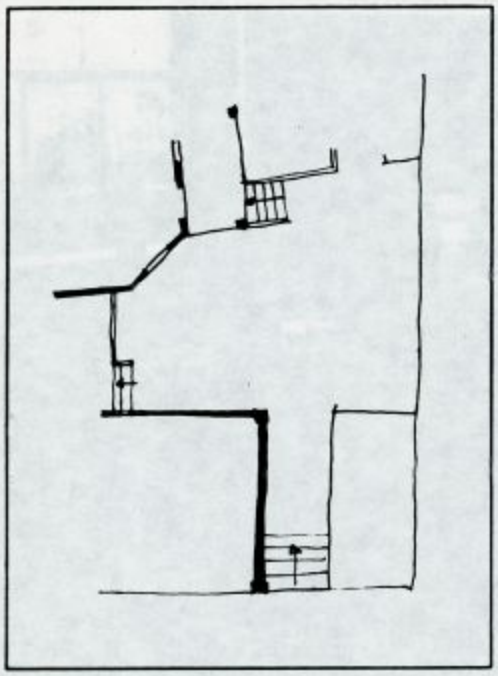
▫ 11. Courtyard feels ignored.

The apartment and shop spaces felt very real but the courtyard space was very unclear. We realized that the courtyard and the building reflect and respond to each other, and that we needed to be developing the courtyard along with the building and not wait until the building was "finished" to complete the courtyard.

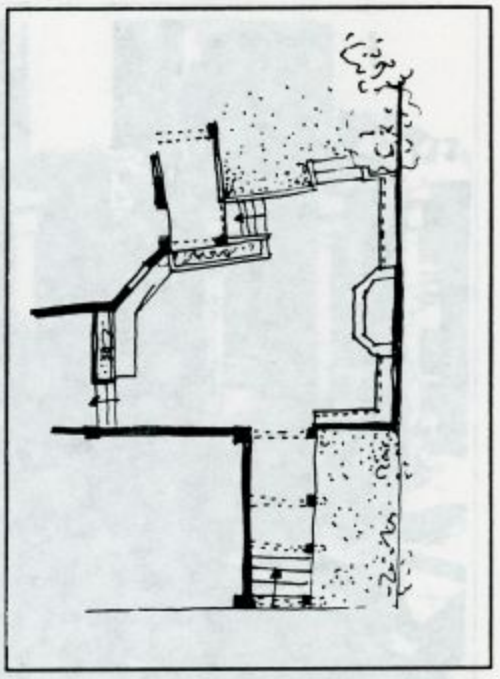
▫ 12. Elevator entrance needs adjustment.

The elevator was supposed to have a small terrace in front of it. Its size and height were decided by testing and adjusting on the site.

▫ 13. Main courtyard space feels weak.



Courtyard "before"



Courtyard "after"

The edge where the fountain will go felt unenclosed and undefined and the ends by the fountain and elevator felt disconnected. We built a wall with benches around the fountain layout, and laid out benches near the elevator.

▪ 14. Uncomfortable ground floor of apartment.

The living room and kitchen felt exposed, the kitchen felt cramped and dark, and the shop seemed too long and narrow. We decided to move the kitchen into the shop bay and make a formal dining room/library/study of the middle room.

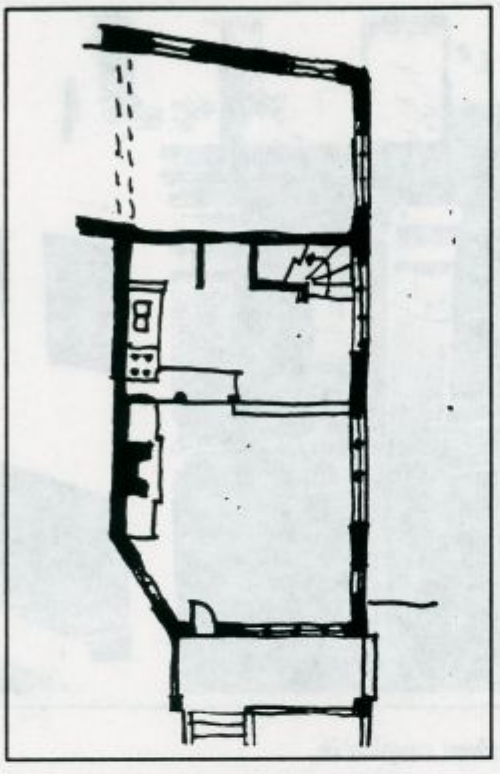
▪ 14. Stairs block kitchen.

The original stairs blocked the entrance to the new kitchen and we move them to the side of the middle room. They are placed so that they hug the wall and don't project into the room.

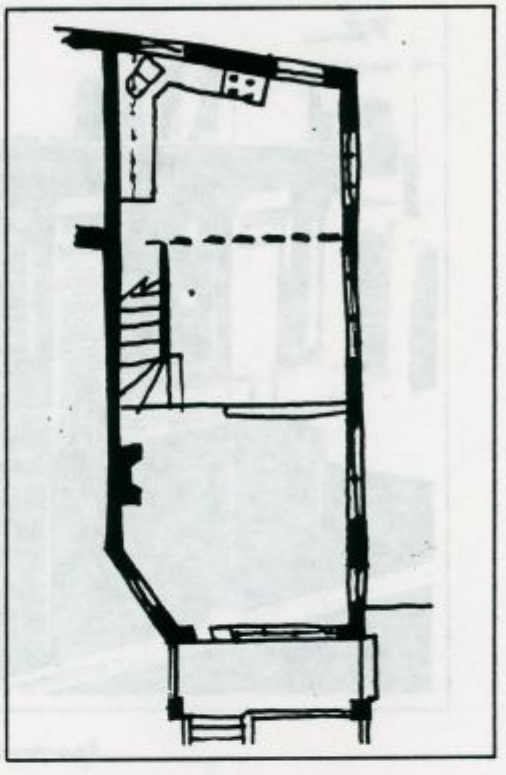
▪ 16. Kitchen ceiling too high.

In their new location, the stairs wouldn't reach the ceiling height, so we deepened the beam and lowered the slab over the kitchen by 20 cm. This created a change in level for the second level of the apartment and a lower, more cozy ceiling for kitchen.

▪ 17. Steps create awkward circulation.



"Original" apartment plan



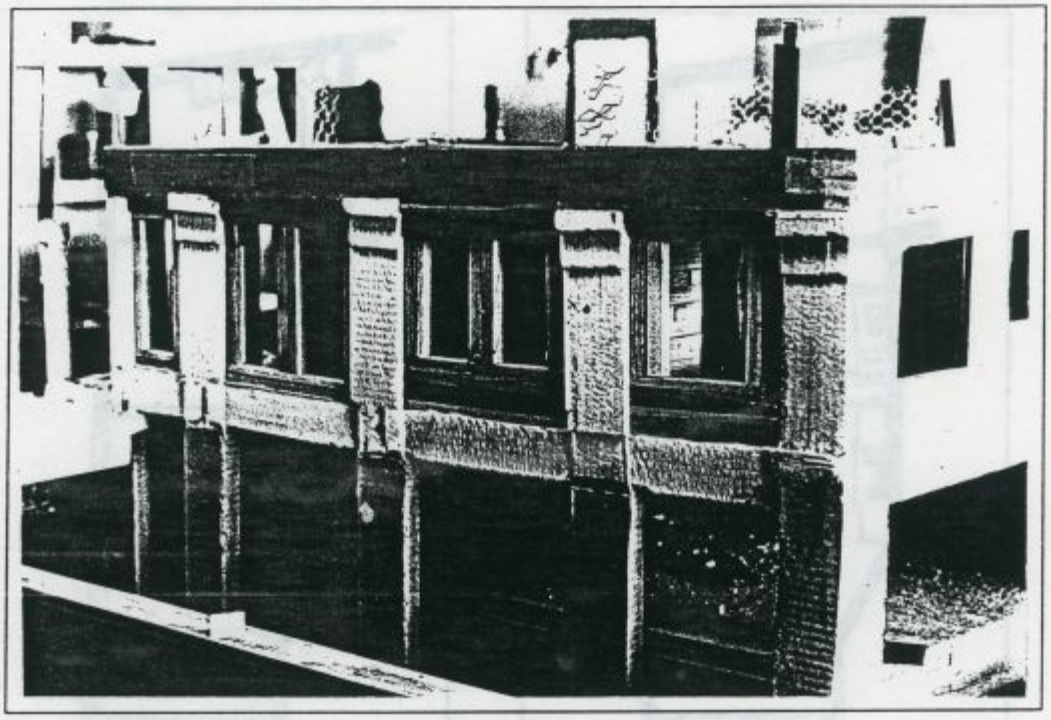
Revised apartment plan as built

The original steps between the living room and middle room brought the circulation into the center of the room so there was little space to rest or be in. We moved the steps closer to the stairs, facing the entrance, but not so close that they disturb the fireplace.

▪ 18. Problems with windows.

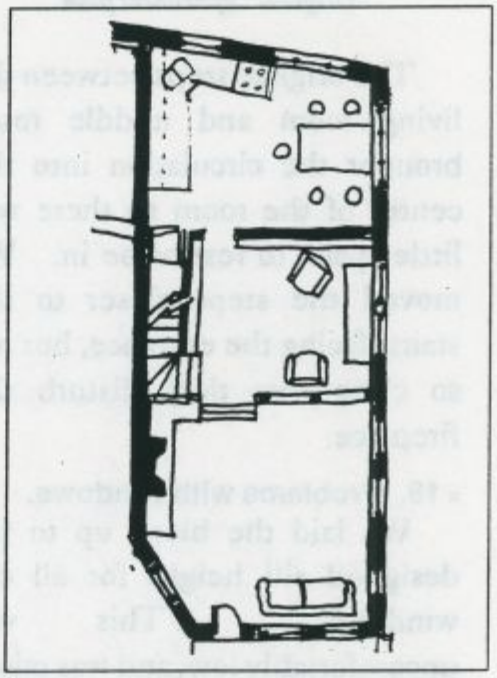
We laid the block up to the designed sill height for all the windows. This was uncomfortably low, and was raised 10 cm. The header location felt too tall and we lowered it 20cm. below the ceiling beam to make a frame and top to the window. Then we adjusted the location and widths of the window openings in the different rooms to get a comfortable balance of light and dark in and between the rooms, and to adjust the wall area in the middle room. Once we set the dimensions, we finished laying the walls up to form the rough openings. These adjustments also relaxed the facade.

▪ 19. Apartment needs degrees of privacy.



Apartment windows roughed in

The kitchen needed to feel private but not cut off. We built the kitchen wall and placed the door so that i) there was a protected space for the kitchen table in front of the window, ii) the kitchen still felt connected to the middle room and iii) circulation though the middle room didn't destroy the space. We also built a low wall with columns to make a comfortable screen between the living room and the middle room.



Finished apartment plan

▪ 20. Fireplace needs adjustment.

The living room was a big, undifferentiated space. It needed something to make a special place

to be in the room that was strong in itself and strengthened the room as a whole. We built a fireplace with built-in benches at one end of the room next to the tall window that looked into the courtyard.

▪ 21. Fountain needs adjustment.

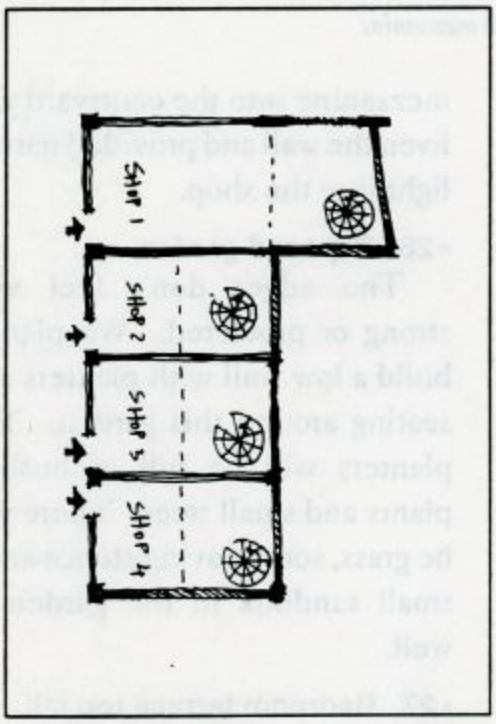
We adjusted the size and location of the fountain so that it helped to make a special place in the courtyard and to strengthen the courtyard's over-all feeling.

▪ 22. Shop layout cut up space.

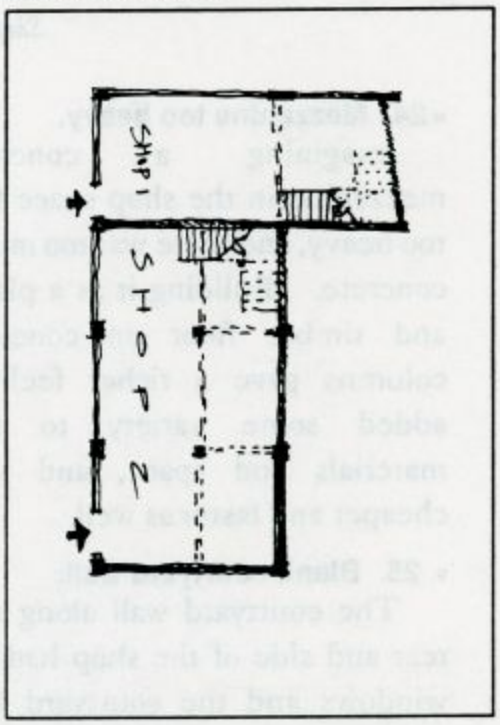
Before building the walls that subdivided the shops, the space as a whole felt good. We didn't want to go in and chop it up so we divided the shops into two larger shops that kept the space whole rather than by the bay spacing.

▪ 23. Mezzanine cut off from shop.

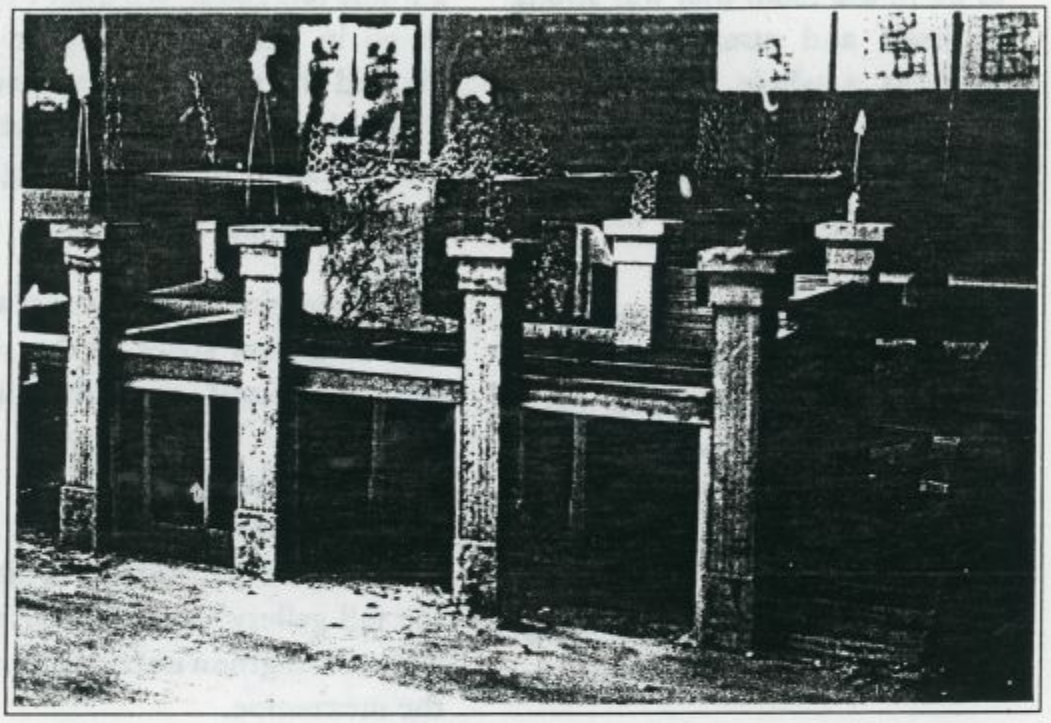
The original mezzanine cut off the tall gallery space of the shop and was itself cut into little cubicles. We removed the secondary beams, lowered and narrowed the mezzanine, and removed the partitions to enlarge the tall gallery space of the shop, and to strengthen its connection to the mezzanine.



"Original" shops



Revised shops as built



Shops with mezzanine

▫ 24. Mezzanine too heavy.

Imagining a concrete mezzanine in the shop space felt too heavy, and there was too much concrete. Building it as a plank and timber floor on concrete columns gave a richer feeling, added some variety to the materials and space, and was cheaper and faster as well.

▫ 25. Blank courtyard wall.

The courtyard wall along the rear and side of the shop had no windows and the courtyard felt blind and dead. We added two sets of small windows that looked from above and below the mezzanine into the courtyard that liven the wall and provided natural light into the shop.

▫ 26. Exposed garden.

The edges don't feel very strong or protected. We plan to build a low wall with planters and seating around this garden. The planters will be full of bushes, plants and small trees. There will be grass, some paving stones and a small sandbox in the garden as well.

▫ 27. Bedroom terrace too tall and obtrusive.

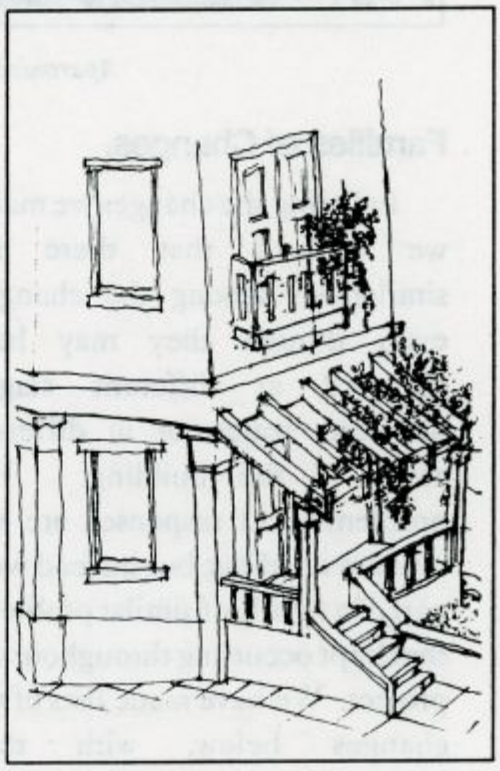
The original design called for a terrace from the master bedroom

to form the roof of the entry porch. This terrace intruded on the garden and courtyard and made the porch feel tall and narrow. We replaced the terrace with a French door and balustrade in the master bedroom and built a lower, pitched roof over the porch.

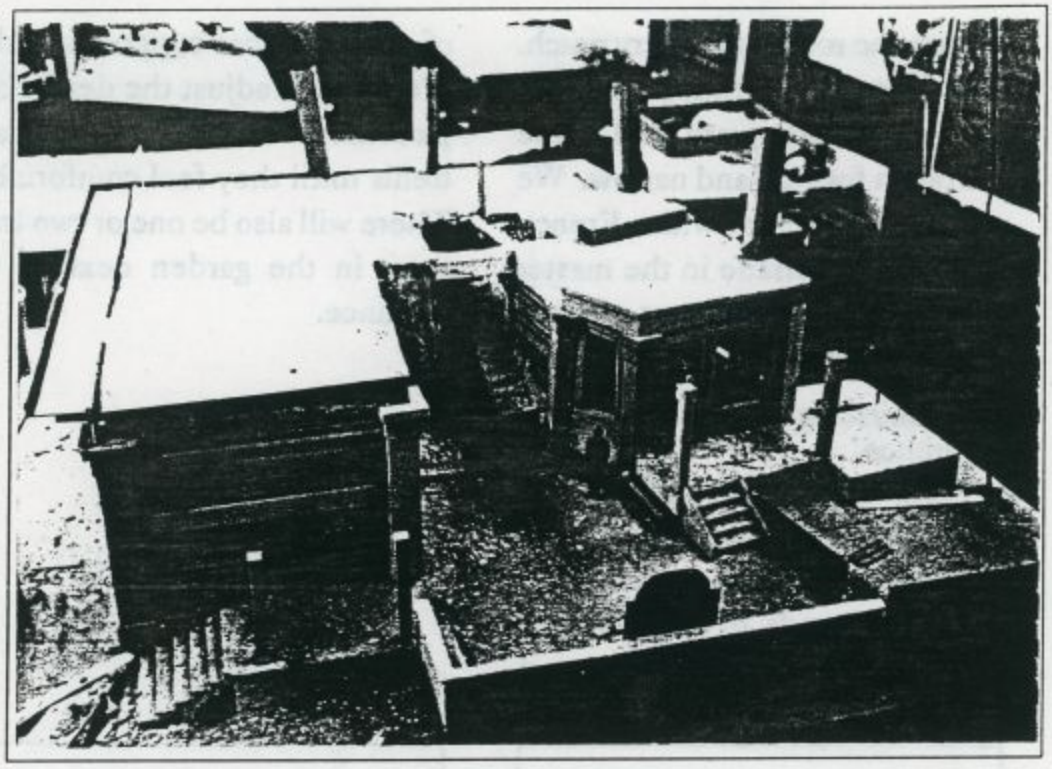
▪ 28. Adjusting courtyard entrance.

The building feels very tall next to the entrance, and the space between the street and the courtyard needs to feel stronger and narrower, more enclosed. The original plan called for a row of columns that support a trellis. We test and adjust the design and placement of the columns and trellis until they feel comfortable. There will also be one or two large trees in the garden next to the entrance.

"Original" terrace/porch



Revised terrace/porch as built



Apartment Building After Changes

Families of Changes.

In listing the changes we made, we noticed that there are similarities among the changes, even though they may have occurred at different stages, different scales, or in different areas of the building. The problems and responses are not random or ad hoc but instead were part of a family of similar problems that kept occurring throughout the project. We have made lists of the changes below, with their corresponding numbers and titles from the preceding section, and grouped them according to their similarities. There is a heading and an explanation of what seems to be the essential similarity of those changes. Although the headings might not yet describe the kernel of the problem, we feel that their grouping is significant:

- **Making beautiful columns and knitting the base."**

This series of problems and responses is part of a larger vision of the ground floor columns being beautiful elements that unify the shops and apartments and create a

strong base for the rest of the building.

5. Apartment column in wrong place.

1. Shop columns too heavy.

2. Needlessly expensive form work.

9. Base storey columns not unified.

10. Columns built without care.

▫ Connecting larger wholes".

It is important to identify the larger wholes in the project and make sure that they evolve and unfold in relation to each other. Each whole exists both as its own entity, as well as in relation to neighboring as well as larger entities.

3. Schedule needs adjustment.

11. Courtyard feels ignored.

▫ Making good big spaces".

This series of problems and responses deals with the shaping of the larger spaces in the building, both in the shape of the space itself, and also how it relates to the spaces around it.

14. Uncomfortable ground floor of apartment.

22. Shop layout cut up space.

▫ Making good small spaces."

This series of problems and responses deals with the shape of the smaller spaces in the building, and how they relate to the larger spaces.

8. Entrance porch too narrow.

12. Elevator entrance needs adjustment.

16. Kitchen ceiling too high.

23. Mezzanine cut off from shop.

28. Adjusting courtyard entrance.

19. Apartment needs degrees of privacy.

27. Bedroom terrace too tall/obtrusive.

▫ Making comfortable connections and transitions between spaces.

These problems and responses involve trying to make comfortable connections and transitions between larger wholes. Each connection or transition should work within the project's evolving circulation pattern. These were often the most difficult areas to resolve and required a great deal of effort.

4. Courtyard entrance too high.

6. Apartment entry and floor too high.

12. Elevator entrance needs adjustment.

15. Stairs block kitchen.

16. Kitchen ceiling too high.

17. Steps create awkward circulation.

19. Apartment needs degrees of privacy.

28. Adjusting courtyard entrance.

▫ Making "special places."

Special places, such as the fountain and the fireplace, were created to strengthen larger entities. The special places are usually small in relation to the larger room or space of which they are a part, but they are very intense. The presence of the special place in the larger entity, and their relationship to each other, creates a more harmonious place than either could achieve alone.

20. Fireplace needs adjustment.

21. Fountain needs adjustment

▫ Shaping the edges and quality of enclosure.

Here, the concern is with making the boundaries and adjusting the degrees of enclosure around a particular space. Attention should be paid to the quality and character of the boundaries around important spaces like the courtyard, as well as window and wall openings.

7. Apartment entry stairs divide courtyard.

13. Main courtyard space feels weak.

25. Blank courtyard wall.

26. Exposed garden.

27. Bedroom terrace too tall/bulky.

Evaluation

▫ 1. What was our process?

While it wasn't consciously articulated, we had a process that underlay all of our actions that was even more basic than "Find a problem and correct it." Before beginning the day's work, and at the beginning of any new development or change in the building, we would meet to make sure that *what we were about to do was going to be the most effective thing we could do, at that point in the construction ,to strengthen the overall feeling of the building.* For example, when we found that the courtyard entrance was too high, we decided that lowering it would be an improvement but not one proportionate to the time and expense. While laying out the

apartment, when we had nothing but columns built, building the stairs seemed to be the thing that would most define the emerging layout. After that, laying up the exterior walls and setting the window opening seemed to give the most effect for the effort, followed by building the interior walls, and columns, and then the fireplace and benches.

▫ 2. Did our process create a beautiful building?

We believe that this process does help to create a more beautiful apartment building. By allowing us to correct and adjust things that do not feel comfortable, or do not work in some way, we are able to make a building that responds to real feelings and experiences and that is better than the design on paper. We can see, as can the people who've visited the "site", that the building that is developing is better, richer, and more complete than the building that was as drawn. Comments such as "It looks just like a construction site". "Wonderful . . .", "This is the way it should be done." seem to bear this observation out.

The building, so far, feels comfortable and relaxed. Each major element, the shops, the courtyard, and the apartment seems to have their own identity and are also well connected to each other. It is already easy to visualize people browsing in the shops, sitting and sipping coffee on the mezzanine, children playing by the fountain, a person sitting in the window seat reading a book by the fire. Many of the people who see the building model say they can imagine living there, or that they like different parts of the building. These observations suggest to us that the building is starting to come to life.

▫ 3. The problem of time and cost.

In this simulation, we did not resolve the issues of time and cost. Although most of the changes did not involve substantial changes in the building's structure or materials cost, most changes did involve the use of mock-ups, and thus required more time. Thus it is important, before construction begins, to think about which areas might need special attention in the form of special steps or mock-ups, so that these can be done before hand or integrated into the construction without disrupting its critical path. In this simulation, we were able to identify areas that

needed modification, but we were not able to calculate how the modifications would affect time, cost, or the critical path of construction. This still needs to be done.

▪ 4. Balancing efficiency and beauty.

In this simulation we were not building a model but a very small building that was as full of complexity, effort, and surprises as any construction site. In all of the activity we often alternated between two extreme ways of working.

One extreme was getting caught up in testing and re-testing something that wasn't working. Having found something that didn't fit or feel right, we were sometimes almost afraid to continue building and would check and re-check our solution without trusting what we had already learned or liked. Usually, just starting to build some part that we were sure of would show us the way to go — like laying the walls up to the sill level, finding it was too low and then raising it to a comfortable level.More rarely, but more catastrophically, we would get impatient or frustrated and work too quickly or carelessly and build something that wasn't as good as it could have been — like the too high courtyard entrance — or that was really bad — like the two columns in the apartment that had to be re-built.

The gist of this observation is how critical and difficult it is to be aware of how you are working. To be able to make steady progress and to pay attention to your results is the essence of this integrated process. It takes effort and discipline, amid the activity and complexity of "making" the building, to remember "to make a beautiful building." Conversely, it takes experience and trust in the process to continue building when all the steps and results are not fixed or completely known.While much of this has to do with your attitude and awareness, there needs to be a way of measuring and keeping track of how the work is progressing, and how the time and money in different areas are being balanced. We have an accounting and monitoring process but were not able to test it in this simulation. We do plan to test it in another simulation.

▪ 5. Making the building live.

As helpful as it is to correct and adjust the elements and

relationships in the building as it is being built, this is not enough to bring it to "life." You have to adjust the right ones, or the ones that will give the greatest, or most appropriate effect. A good building, one that "lives", is not an even, homogeneous structure. In the building as a whole, in groups of rooms, in individual rooms there are relationships, places and elements that are essential to the feeling created there. For example, the way the edges are made in the courtyard has a great impact on whether it feels calm and harmonious and this effects the whole building. In the shops, subdividing the bays would destroy the feeling of the large space and make all the effort developing the shop columns marginal.

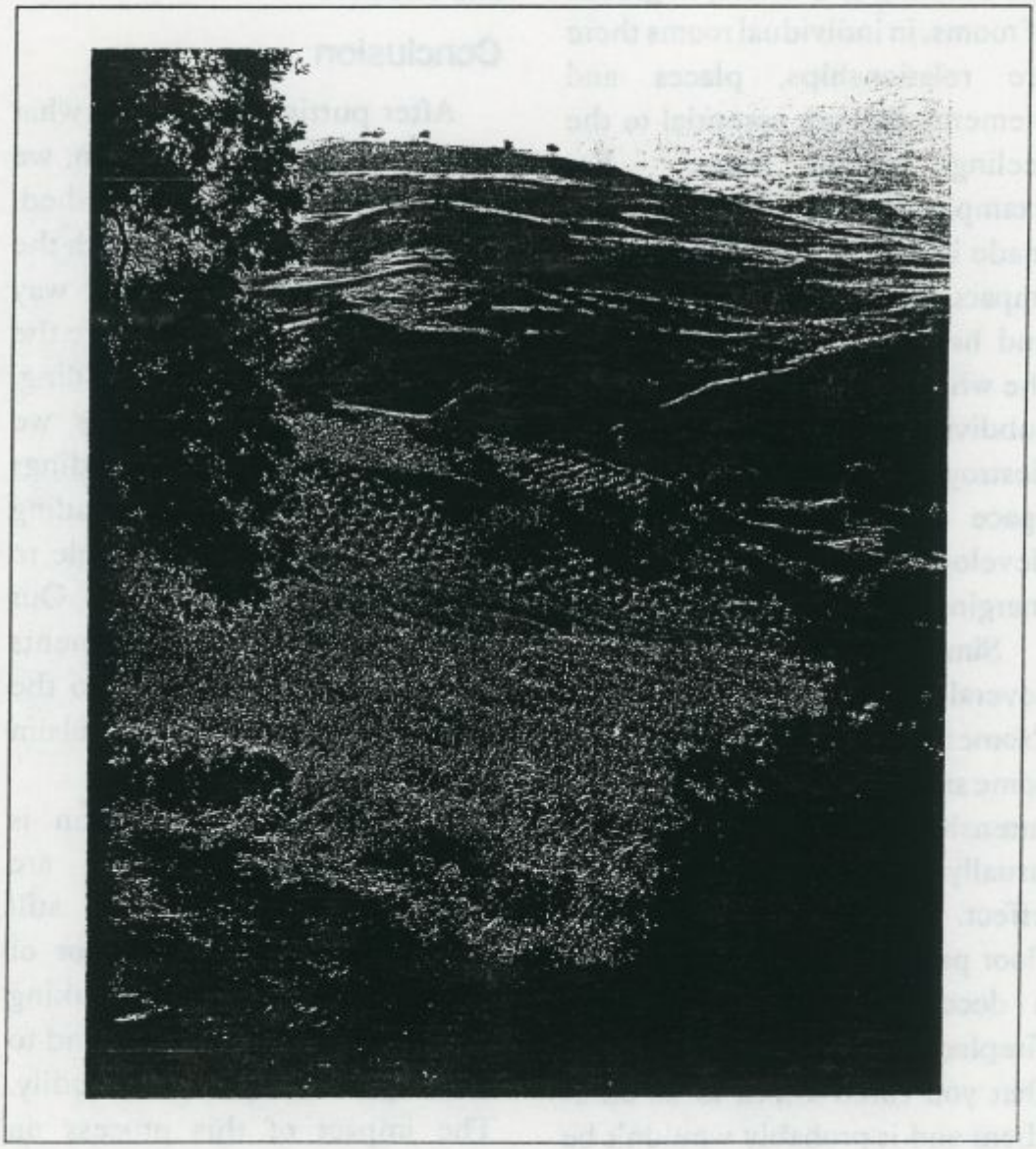
Similarly, while there might be several different ways to created "something special" in a room, some smaller place or element that intensifies the whole, there is usually one that has the most effect. You could be considering a floor pattern, a beautiful window, a decorated wall or ceiling, a fireplace or an alcove. It's unlikely that you could afford to do all of them and it probably wouldn't be as deep as finding the one or two that create the most feeling for the least effort. While it's important to be able to adapt and change according to the growing life and feeling of the building, that freedom is trivial if the adjustments aren't appropriate and effective.

Conclusion

After putting into words what we did during the simulation, we can look at what we accomplished. The integration of design with the construction process, in the way we have done it, does improve the quality and life of the building. Compared to the drawings we started with, and buildings produced by the prevailing process, we feel we were able to make a better building. Our feelings about the improvements and bystanders' responses to the building seem to bear this claim out.

However, this integration is not seamless, and there are important questions still unaddressed. It takes a lot of effort to pay attention to making things better at every step, and to working smoothly and steadily. The impact of this process on

construction time and cost is not known from this study. A further simulation is planned to understand the changes' effects on time and cost and to develop methods of managing and controlling those effects. While there are issues that have yet to be resolved, this study is a step towards creating better buildings in the world, buildings that we love and care about.



A New Apartment Building Process

Time, Money, And The Building Process

Shawn Bradbury and Jonathan Whitney

In this paper, Bradbury and Whitney try to formulate a practical way of making the inherently slow process of adaptation, fast enough to be consistent with time and money in the building process.

The example they take, is a front terrace which they recently built for a fraternity house in Berkeley. In the course of describing this front terrace, and the evolution of its design during construction, they formulate three basic policies which, they believe, will enable a building project to keep to the subtle adaptations previously put forward in recent CES publications, but yet guaranteeing the efficient use of time and money to keep the project within limits of time, and within budget.

I consider the approach to time, above all, of interest in this paper. Previous projects undertaken by myself and others have succeeded in keeping cost well within limits. However, the control of time is extremely difficult. Building projects which are beautifully and carefully adapted, do have a tendency to run out of time, or to push time beyond available limits. It is not yet clear whether the proposal made by Bradbury and Whitney is workable, and if it works, consistently, throughout the construction of a larger project

If the proposal made by Bradbury and Whitney can be shown to work, for larger projects, they will be very useful indeed, even essential in their results.

However, they have not yet shown this to be possible. In the one case that they examine in detail, they are both designers and artisans. Thus, the fact that they could keep moving, without impediment, and keep the work on schedule, is true — but it is true because they tackled a tiny, tiny project.

They have not answered the problems of dealing with this in a larger situation that is inherently multilevel. If the designer is one person, and the artisan is another — that is the model they imply — then the freedom of the artisan, to move quickly, has one of two potential problems.

Either, they do not understand the context, conceived by the architect at some other larger scale — and there is the danger that the parts, conceived and carried out by them, will not fill out the whole, nor enhance the whole. How is this to be prevented. In what form, can the architect communicate to them, and yet give them the freedom to move fast, without impediment.

On the other hand, if they themselves were architects, how would they communicate to the craftsman, in such a way as to keep the whole intact and alive, and yet allow the details to be beautifully and correctly formed, in a way that enhances the whole.

The problem is the same, whether it is looked at from above, or from below. Although this paper is suggestive, it does not yet deal with this fundamental problem, in a way that holds real promise for the large scale problems which these authors claim to solve.

The Building Process is likely to be consigned to a mere footnote in architectural history books, unless a more efficient, realistic way can be found to implement it.

Certainly some very lovely buildings have taken shape over the last two decades as a result of architects applying building process principles. And while some of these structures have been completed by graduates of the Building Process Area who have been working independently, the vast majority of successful examples of "wholeness architecture" have been created by the Center for Environmental Structure (C.E.S.). These buildings have an undeniably human feeling within them; a feeling which varies in intensity from project to project, but which, on the whole, is far greater than that found in conventionally-built structures. It is tempting to say that these buildings are more whole than their modernistic, mass-produced counterparts. However, the unfortunate fact, known to many admirers of Building Process ideals, is that too often, Building Process projects have taken an inordinate amount of time and money to complete. A single-family house in the Berkeley hills was recently finished after more than four years of continuous work—an expensive and painful indication

of a Building Process that was most definitely not whole in some very important ways. What are the reasons for such excesses? Are there flaws in the Building Process philosophy itself, or is there a breakdown occurring elsewhere that can be identified and corrected, creating a modified process that not only generates beautiful buildings, but can realistically compete with modern contracting costs and timetables?

In the interest of answering these questions from an informed position, we in the Building Process Atelier took on a real project—the creation of a streetside terrace in south Berkeley. The construction site became a living laboratory, a place where we tested our arguments through action, under extreme pressures of time and money. This paper will discuss the streamlined decision-making process which we began to utilize during the making of this terrace, its advantages, and, most importantly, its usefulness to other architects and contractors wishing to apply Building Process principles in their own work.

Problems with the Building Process

Many architects find themselves captivated by the ideas expressed in the Building Process literature, but at the same time they are wary of the expense of the custom craftsmanship and detailing seen in examples of built work. Theoretically speaking, the Building Process approach is designed to account for such expense by asking the architect to leave the final details up to the craftsperson, and to only indicate a rough idea of what is to be built on the plans. The savings in design time can then be applied toward on-site design decisions, which will be more wholesome and harmonious due to their sensitivity to the existing environment. This approach is well-documented in many of C.E.S.'s publications, and it is clearly successful in terms of its ability to generate profoundly beautiful buildings. The problem is that it is not saving anybody any money. In fact, this approach of on-site design is eating up huge amounts of time and labor, and, because of our combined experience working with C.E.S.,

we think we can pinpoint the reason why:

- **Not enough decision-making authority is being given to the craftsperson.**

Under the existing C.E.S. management, a project is broken down into a series of operations to be completed as wholes, such as a deck or a built-in seat. Individual craftspeople are hired to build these small wholes for a given dollar figure; the idea being that they are capable artisans who can use their expertise to make sensitive and efficient design decisions as the need arises. This philosophy would seem ideal, providing a great deal of job satisfaction for the craftsman, while at the same time saving design costs for the architect/project manager. Unfortunately, there is a tendency on such projects to actually limit the authority given to the craftsman for making these relatively small decisions. Why this is the case, we cannot say, but the situation is clear to those who have worked on such projects: If you are a subcontractor in charge of part of a C.E.S. project, you make mock-ups and provide design alternatives, but the actual decisions are almost always made by managers or higher-ups. While this may be slightly damaging to the pride of the craftsperson, the real danger is that invariably one is left waiting for hours, days, or sometimes even weeks at a time while the proper authority is tracked down and a time is arranged for a future conference about the proper course of action. This is highly disruptive to the momentum which must be maintained during the creation of a whole. At a simpler and more straightforward level, this waiting game costs huge amounts of money. If a craftsperson is not allowed to make important decisions about the thing he or she is making, work on that part of the project essentially stops until further notice. Schedules are revised, workmen are redirected to other tasks, and the fundamentally organic nature of the building process breaks down completely. Moreover, for each of these decisions, the architect is required to drop what he or she is doing and travel to the building site. Normally we would consider this a good thing, but because so many design decisions are left to

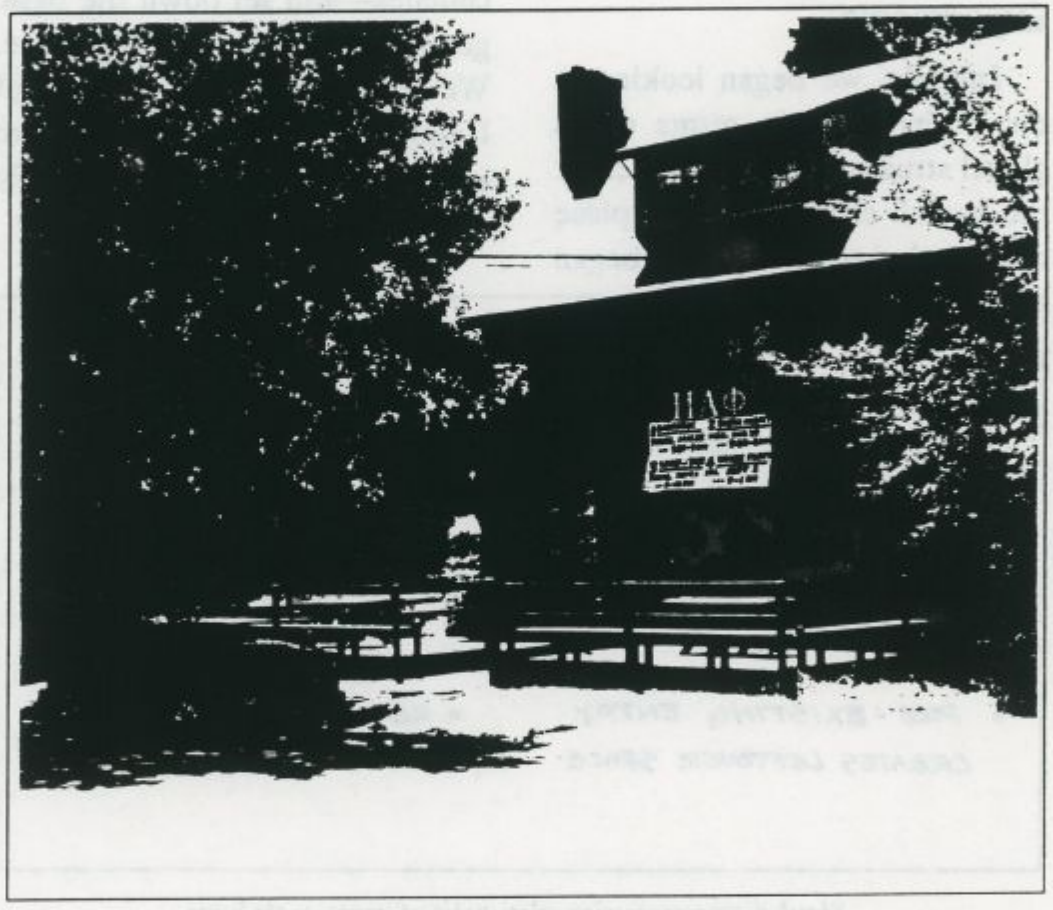
be determined on-site, this repeated traveling to and fro becomes a disruptive, time-wasting and costly action for both architect and builder, spelling almost certain financial disaster. We feel sure that it is because of this fragmented, herky-jerky, hierarchical decision-making process that all of the time and money—and perhaps some of the life—gets sucked out of Building Process projects.

Finding a New Model

What, then, would we do when we were faced with actually making something in the real world? In order to best answer this question, let us first make something clear: We do not think that there is any major flaw within the Building Process approach itself. On the contrary, we think that the ideals stated in many of C.E.S.'s books are right on the money, and have the potential to entirely change the present way of building. We simply suggest that they need a modified form of implementation in order to live up to this potential. Keeping these thoughts in mind, we began our construction process using most of the familiar Building Process techniques, including on-site mock-ups, construction experiments, and the like. The main distinction between what we accomplished and what has been achieved by like-minded architects in the past, is not the product so much as the process. Our goal was to find a process for applying wholeness-forming techniques in a realistic and cost-effective manner. And, in fact, as we worked, we did begin to get a sense of a slightly modified management approach. We think this method has the potential to give architects and builders a more appropriate and clearly defined structure for making wholeness-based decisions.

We discovered this modified management model during the construction of a new entryway and small terrace at 2534 Warring Street, Berkeley, California. The circumstances involved a very limited budget of $1,200 with a time frame of three months. Our speed of work was comparable to that of a conventional contractor building from pre-drawn plans; an approach that was to be absolutely necessary if we were to complete the project on time. Since we

wanted the terrace to have wholeness as well, we had to make on-site design decisions that were thorough, yet fast-paced enough to compete with a typical construction schedule. Our maxim was to climinate the disruptive gaps between design and construction which have plagued Building Process projec.s in the past.



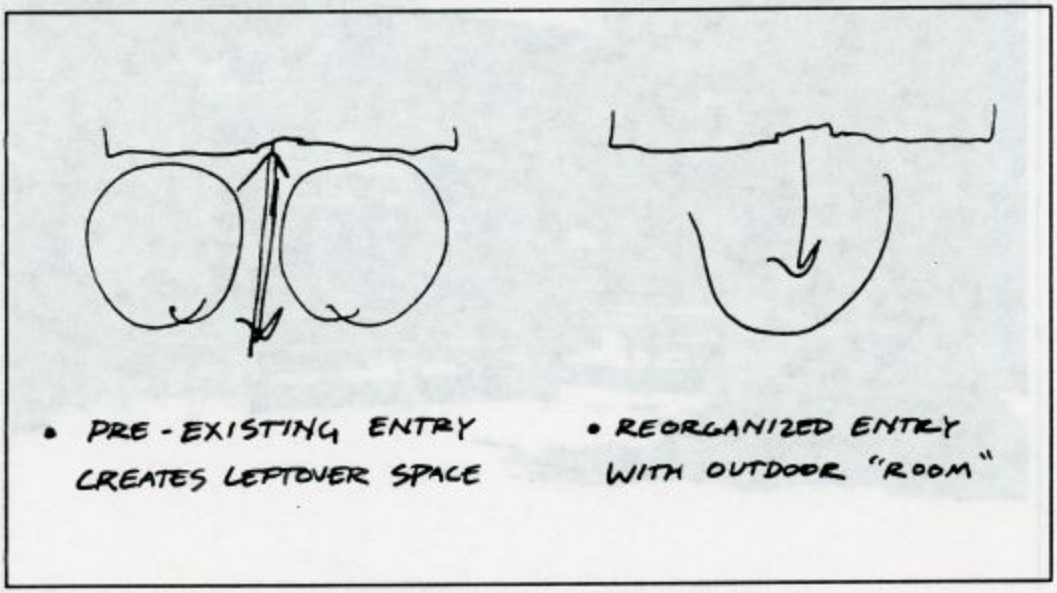
Pre=existing conditions at 2534 Warring Street.

In addition, we wanted to make our basic process work for other projects, perhaps of a larger scale. This meant that we had to be very aware of the types of decisions we were making, and also consciously determine who would best make these decisions on other, more complex real-world projects. To show you what we mean, let us

briefly explain how we began our work, and then examine in detail the making of some smaller, constituent wholes in our terrace project.

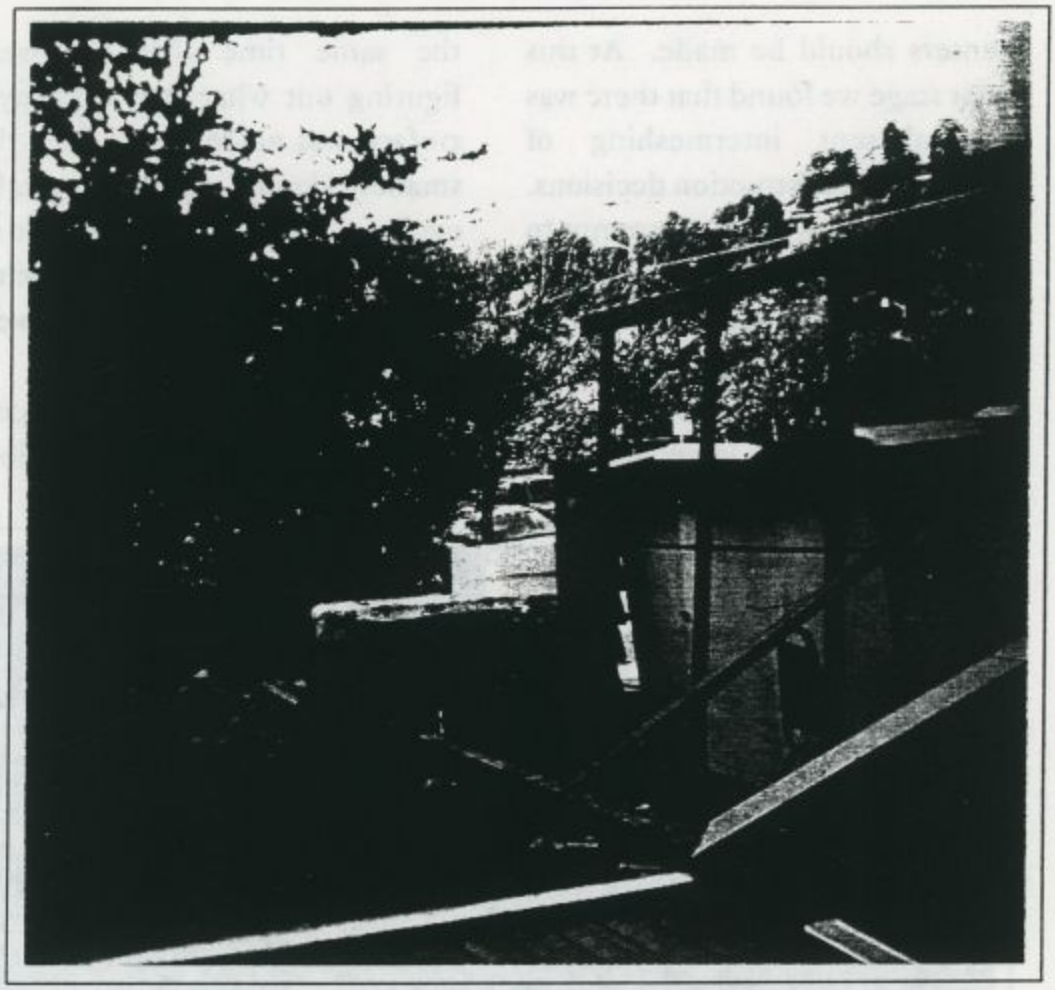
The Construction Experiments

Initially, we began looking at the project site in terms of its global structure, getting a feel for the overall character of the place that needed to unfold. We began to build up a picture in our minds of a central "room"—a natural gathering spot overlooking the activity of the nearby sidewalk and street. We quickly grabbed some scrap wood, stakes, and flagging tape—as well as a few old couches—and set down the basic geometry and "feel" of the space. We continued this process of laying out the global structure until the major wholes were fairly well mapped.



Sketch diagrams showing relationship of terrace to the house

These major wholes emerged as three main entities: the terrace "room", an adjacent deck, and a paved walkway connecting the terrace with the street. With some very general characteristics (size, shape, level, enclosure, etc.) of these centers set clearly in our minds, we felt quite confident that what had begun to emerge was



Initial mock-up laying out global conditions.

satisfying and potentially harmonious, even at this obviously crude stage of development.

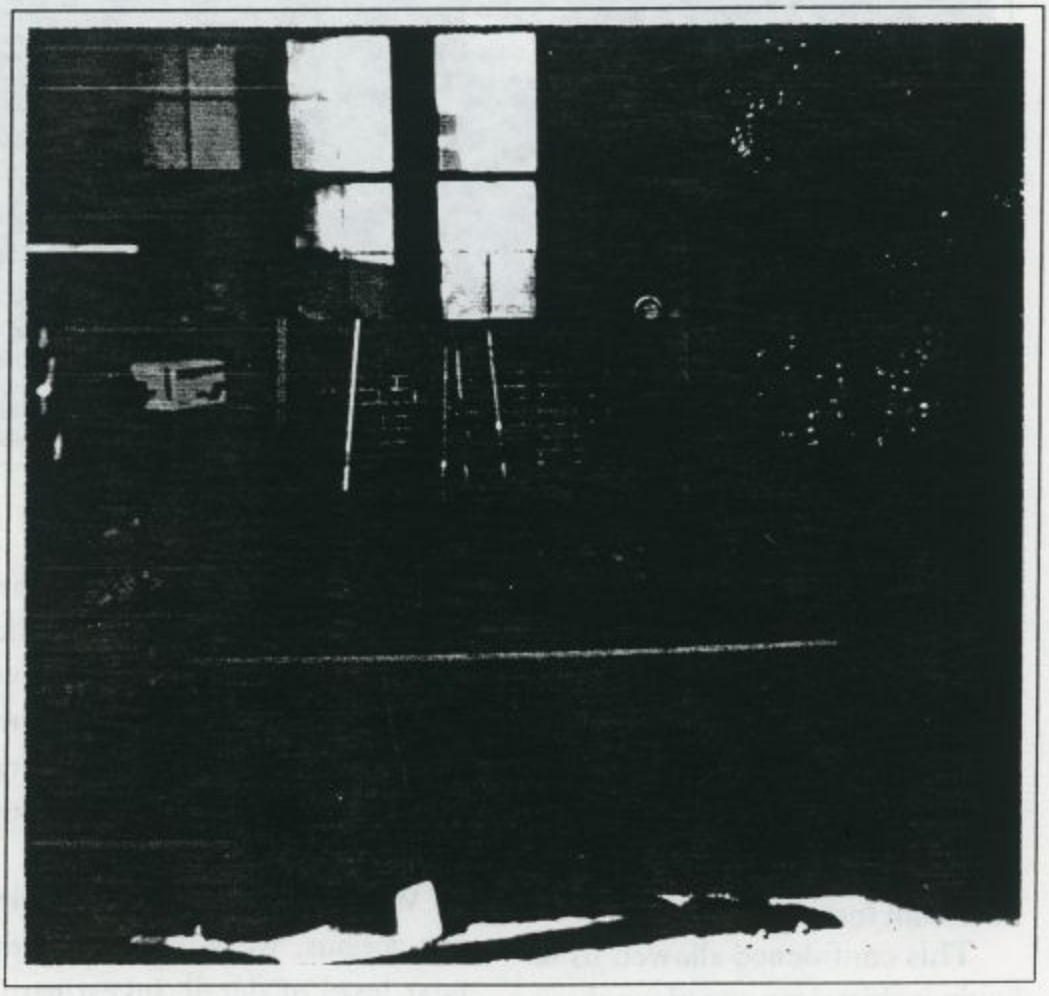
▫ In short, we discovered it best to lay out an inspiring global structure without making decisions about the details of the built form.

This confidence allowed us to begin looking into questions about how these entities were made, and how they might become rich objects; whole within themselves while at the same time strengthening the overall character and structure of the place.

With this philosophy dictating our actions, we advanced to the next level of detail, investigating the possibilities of how the smaller

centers should be made. At this next stage we found that there was an inherent intermeshing of design and construction decisions. For instance, we had to attempt to design one of the smaller centers, a walkway in this case, so that it was a beautiful thing. This meant that we have to consider its relationahip to the larger whole at the same time that we were figuring out what the walkwayÌs surface was made of and how the smaller details might logically evolve. It seemed to us that in some way we were making decisions that bridged three levels of scale all at once.

This proved to be a difficult phase; trying to examine possible



Picture of the basic walkway layout with scraps of wood

construction techniques without having decided on the materials making up the larger whole. We had to try and see in our minds what the essential character of the place was, and what we could make the walkway out of that would enhance this character. It was at this stage that we determined that the walkway would be best if it was made of a series of cast concrete pavers; big enough to step from one paver to the next, yet small enough for a visitor to be able to relate to each one on a personal level.

▪ We knew what the character of the smaller wholes needed to be, and this led us toward trying to make them have life at the human scale.

The need to keep a personal feeling in each paver led us to think of them as individual entities, separated by a simple boundary of gravel. At this point, we started getting a feel for what the general dimensions of these pavers might be. The size of the walkway was such that small pavers, on the order of one foot square, would have created a dizzyingly complex field of centers—thus, we knew this size would be too small. On the other hand, we felt sure somehow that maintaining a human relationship with each and every paver would only be possible if they were less than two feet square. We reached these conclusions with very little effort—not because we are particularly talented designers, but rather because the actual place was telling us what needed to be done. We saw at this point that anyone who was making paver blocks here would have been led to the same basic results, so long as they approached the task with no previous images or preconceptions. Although we felt good about what we were making, we also felt somewhat not responsible, because it was the most ordinary thing we could have made there and we were simply responding to what the place required. In any case, with the general size and material limitations, as well as the basic character of the walkway in mind, we were at the point where we again felt comfortable with the emerging whole.

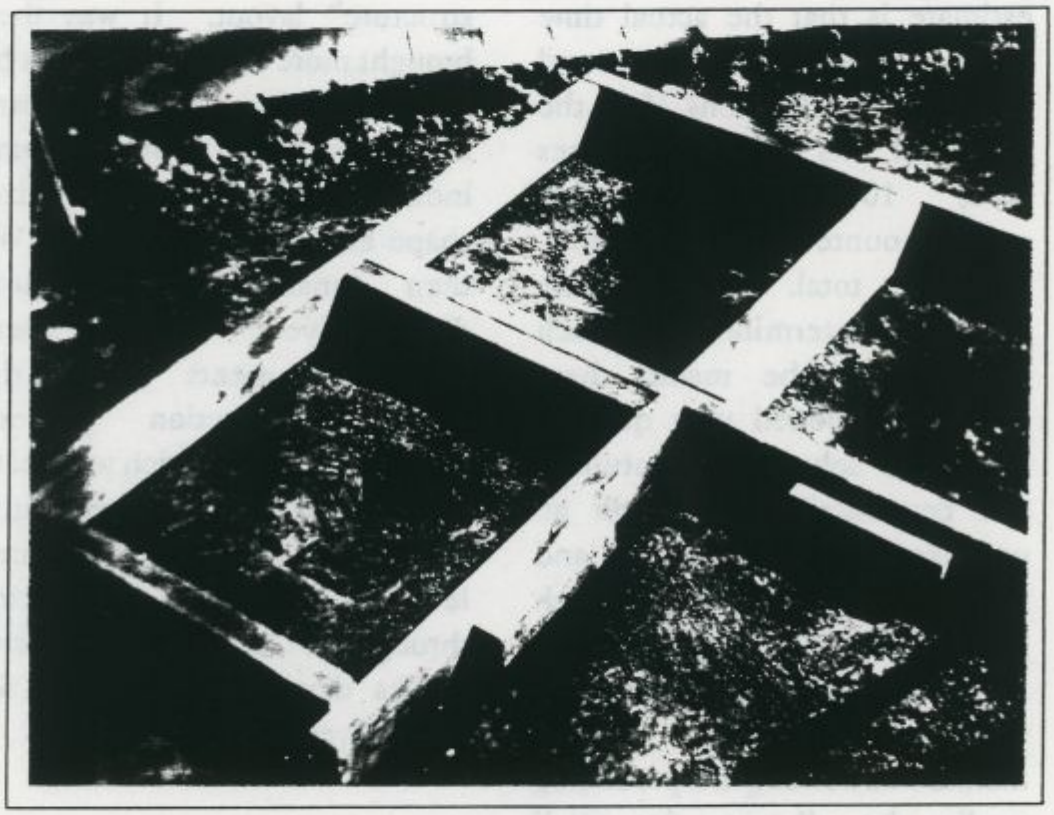
We now approached the final round of design and construction decisions for the smaller whole of the walkway. This is the level at which we essentially assumed the

roles of craftsmen and made provisions for the size, exact pattern, and level of detail of the walkway pavers. Because the general area and shape of the walk had been determined by the global structure decisions, we allowed ourselves a half-day to figure more specific dimensions and decide on the pattern. A pattern was found that was easily made, had the ability to generate a beautiful field of centers, and which also felt intuitively right. By etching this pattern in the earth, we were able to experiment with a few different paver sizes, and a functional and personal size was readily found—they proved to be most successful at roughly 20 inches square.

We used standard 2 x 4's to construct a 3-paver template—mostly because they were close at hand and because two of them stacked together would create a gap just about the width of the packed gravel

Mock-up of paver with dirt and gravel.

boundary between the pavers. During each pour, we used an available troweling edger to shape a simple little detail into the surface of paver; in retrospect, this detail creates a transition between two very different levels of scale, but at the time we merely noticed intuitively that it was something that needed to be done.



Paver template.

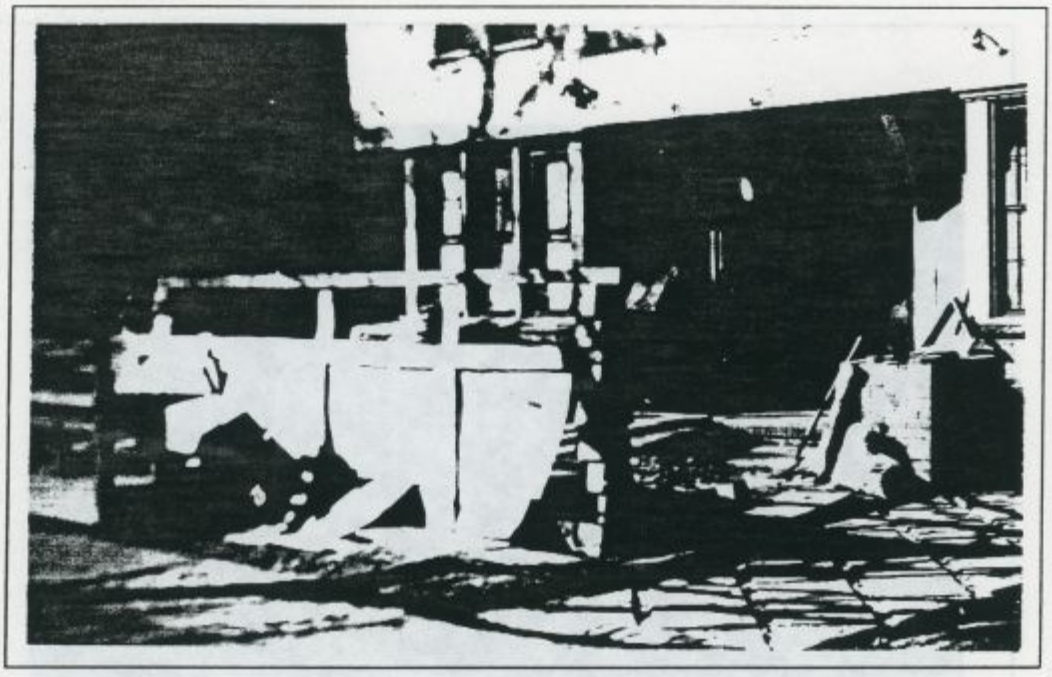
Another builder might have quickly created a stamp of some sort to provide a similar level of detail. We think that it would not matter so much exactly how the detail was made or what it looked like, so long as something was done to give each paver an individual identity. It has been our experience that many people, including those unschooled in building process concepts, have an intuitive understanding of such small, personal design issues. It is human nature to make things in this way.

We tried to keep all of these small-scale decisions at a very practical level of construction, which at the same time would respond to the human quality of the details. Our very conservative estimate is that the actual time spent making design and construction decisions for the pavers at this level—3 minutes here, 10 minutes there, etc.—amounted to no more than two hours total. The complete process of determining how each paver would be made, then, actually happened very quickly. We based solutions on intuition and constructibility through an unbroken cycle of mock-ups and fast layouts. This approach proved helpful in keeping up the momentum needed to build the walkway component. It also maintained a strong life-producing quality by allowing for small design decisions which a conscientious craftsman would be capable of making.

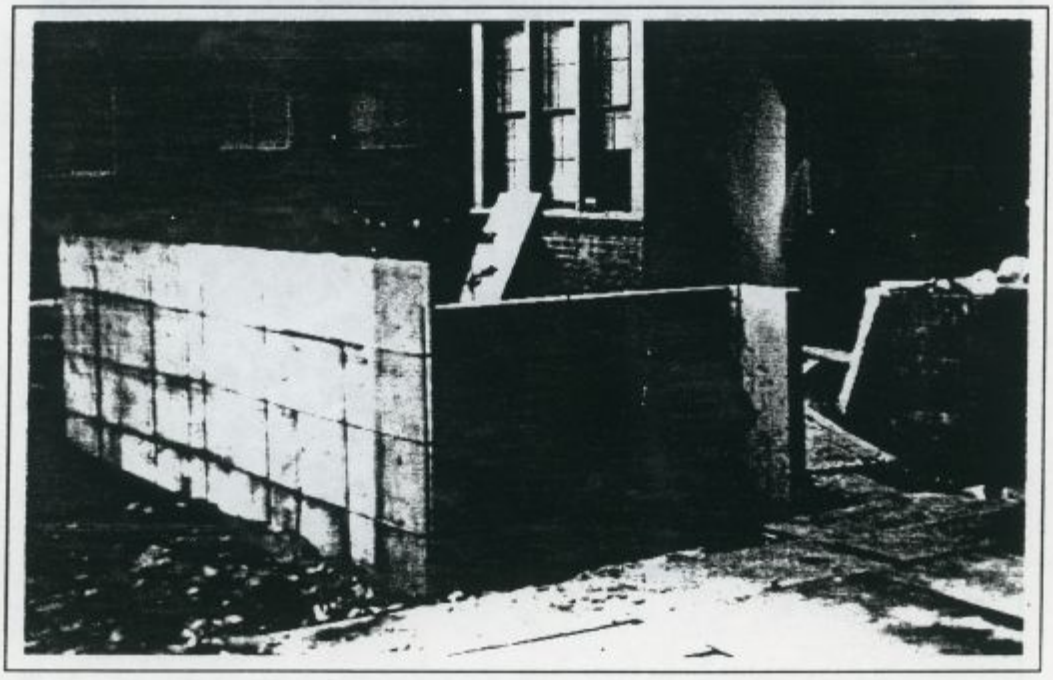
▪ At this third level of wholeness decisions, the design of all characteristics and details was handled entirely within the construction process.

We used this decision-making process as a model for making the other component wholes, and were pleased to note similar results most of the time. The cast concrete wall encircling the terrace, for example, was first hinted at by the initial "global structure" layout. It was then brought more clearly into focus by a series of wood and cardboard mock-ups, which provided some indication of the general size, shape and basic materiality. We then made some more detailed—yet still very rapid—refinements during the actual construction process, resulting in a wall which we feel to be whole in terms of both beauty and budget. We used these three levels of decision-making throughout the project, with results that we hope speak for themselves.

The finished walkway.



Wall mock-up with cardboard arches.



Wall with formwork, prior to pouring.

Application of the New Process

We came away from our experience of building with the feeling that we had achieved something quite important. We had done more than just construct a terrace, we felt; we had actually identified some basic management techniques that seem necessary if one's goal is to create life in a straightforward and cost-effective manner. These techniques are based on a sort of breakdown between decision-making levels that we observed during our construction process. We believe them to be generic, rather than specific to our project, meaning that if we can describe when they naturally occur, they should prove useful to other budget-conscious architects interested in creating greater life.

In the previous section, we described three basic divisions which we noticed while making design decisions. First there was the process of laying down the global structure, followed by the fleshing out of the smaller component wholes (defining their more specific character); and finally there was the actual construction detailing and decision-making at the smallest and most personal level. This pattern suggests to us a modified design/construction framework which we feel would prove to be viable at small-to-moderate scales. Here are our guidelines, applicable to any project, which we believe would create a less expensive, more streamlined life-building process. Our three suggestions are as follows:

- **We believe that the first sequence of "mapping out" major centers is best handled solely by those responsible for the primary vision which ties the project together.**

In our particular situation, we were the people generating this vision. But in other cases, this role might be filled by a project architect and/or project manager, or even by the owner. There are certain stages at which the craftsman need not be involved, and at this global level, the sensitivity and perceptiveness of the architect is clearly much more valuable than the detailed knowledge of the craftsman. C.E.S. already uses and encourages this approach of on-site layout in their own work, so

it may seem unnecessary for us to repeat it. However, it is only this first level of what we might call the mapping of one's vision that our approaches overlap; at the next stage of design, the two perspectives begin to differ.

- **It seems crucial that the project manager and a craftsperson work together to develop the smaller wholes. When they part, they should have the same understanding of the general nature of the project, and must also agree upon the essential character of the smaller element to be built.**

As we built, we had to consciously separate levels of decision-making, trying to find a boundary between those decisions appropriate for project managers and those best left to the artisans themselves. Although it is natural for the architect to want to oversee the design of even the smallest details, we feel this type of exacting control is ultimately harmful to the unfolding of the whole. Such intimate involvement and perfectionism is, in reality, a liability—costing both the architect and the builder their time and money—and inevitably leading to a breakdown in the flow of construction. To avoid this, it seems that the artisan/builder should have a certain level of autonomy, creating a situation in which he or she can be free to make timely design decisions based on their expertise and individual judgment. Of course, experience tells us that a craftsperson left entirely to their own devices will rarely create something in tune with the surrounding environment. There must somehow be an "orientation" process, then, in which the project manager tunes the builder into the unfolding wholeness, and provides the character—as well as some basic size and material limitations—for each smaller component. At what level can this transfer of authority begin to take place?

- **When the scale of construction reaches the personal level, the craftsman can make all further design refinements based on their knowledge, experience, and intuition.**

Anyone who has made something real knows that whatever it is you are making, you cannot know exactly the best way to make it until you actually begin work. For example, you cannot determine the shape of a pot until

you begin working the clay; with each minute that you spend forming the material higher, you begin to know more about what the pot is and what it needs to be. Suddenly, you are making the rim, and the refined way in which you get the edge into just the right shape is totally a result of the form that has evolved over the last few minutes, and is not based on any preconceptions you may have had about what you were going to make. Yet the pot is of just the right character; somehow exactly right. Perhaps an easier example to understand is this: You are writing an essay, and you of course know the subject. You even know the tone of the writing, and what its effect on the reader will be. However, you will not know which words will be used to create this effect, when you will use them, and in what order they will take shape, until the actual process of writing begins. It is literally impossible to know any of these things beforehand.

This is also the way it is with building: It is impossible to know the best technique for constructing a whole until the work actually begins. You may know the materials, the basic size of the thing, and have a clue of how it might best unfold. But you cannot know, for instance, whether the arms of a chair feel best at three inches wide or three and-a-half inches wide until the greater whole of the chair begins to come into shape. You certainly will not know if the arm is to be pegged, doweled, screwed, mortised, or bolted into the chair until you actually come to that connection. However, if you have an overriding philosophy about how the connections in the chair will tend to be, you are 80 percent of the way there. It is important to realize that not every detail can be determined through mock-ups, and it would be financially draining for an architect and a craftsman together to try to find more than a basic semblance of what the real thing will be. The details of the object can only be discovered through the act of making. In turn, the act of making will only be imbued with wholeness if decisions are made at the personal level. What is most important is that the craftsman know the feeling and character being sought, and that they use this feeling as their guide. Even if the feeling produced isn't exactly

right, it will almost certainly be most of the way—probably at least 80 percent of the way—there. This would be a vast improvement over the current situation, and if this delegation of decision-making authority would make the Building Process more financially viable, there is the potential for a great many more life-bearing buildings to make their way into the world.

Delegating Authority

Clearly the major criticism of what we are proposing is that we personally have not been working on what many would consider a realistic project. Our terrace is relatively small as projects go, and we have been working as both designers and builders, rather than as construction managers responsible for actually tuning craftspeople into our project's wholeness. In an effort to discover for ourselves how to begin to tackle this issue, we decided to involve an independent craftsperson in our project, testing the idea of delegating authority by having an artisan individually produce one of the smaller wholes. We asked a local tilemaker to come to our site and cast a series of tiles in the center of each arch of the terrace wall. We had left several small diamond-shaped indentations while making the wall, which we thought could later be filled with some sort of decorative tile. Although we assumed that we would make these tiles, it was a good opportunity to test our ability to communicate wholeness—with definite, tangible results. We walked around the site with the tilemaker and showed her the character of what we were making. We told her that for her tiles she should make something quite simple, without too much geometric elaboration or unnecessary detail. We asked her to think about the pavers that we had made and how they had a certain quality that needed to be maintained or even added to. We also knew that the color of the tiles was to be some kind of reddish or reddish-brown tone, which we asked her to fine tune. Finally, we told her how much money she would have to work with, so she could decide for herself how much time to spend on her small portion of the project. The results were encouraging; while the final tiles

were not what we were imagining in our minds, they were still successful and actually quite appropriate to the spirit of the place. If we had made the tiles ourselves, perhaps we could have gotten them perfect; then again, perhaps not. The fact is that what the tilemaker produced was very close to the spirit of what we would have made, regardless of the specific details. This is, we think, an important development. While these tiles are an isolated and rather small example, we hope that they might show the potential for experiments and relationships of this kind to be successful in larger projects.

Doubts and Fears

This gradual transfer of authority from designer to maker is undoubtedly a scary thought to the discriminating architect. After all, who in the world wants a construction worker making decisions that, if poorly resolved, have the capacity to ruin a building? Nevertheless, if we take a step back for a moment and look at the larger picture, is it realistic to think that truly profound damage could actually be done? The architect has personally laid out the global structure. It is just right. The character of the place is known and clearly defined. Smaller parts of the whole are thought through and staked out, and patterns, sizes, and materials of these components have been decided upon—and communicated to—the component builder. The craftsman knows the feeling of what is to be made, and has entered into a legal contract to build something that—for a given dollar figure—maintains that feeling.

At this point, assuming that the builder has been selected for their abilities by the architect and not just pulled in off the street, how much can actually go wrong? Assuming the worst, if the craftsman exercises poor judgement and creates something disharmonious; at this level of detail, how much does it matter? Wholistically speaking, not very much, we suspect. If the builder misjudges things and makes a deck one foot too wide or pours a cornice an inch too thin, how much disharmony within the total whole is actually produced? How greatly compromised is the overall

wholeness of a structure if the global level is perfect, the smaller components are perfect, and the idea behind the personal details is perfect, but slightly imperfectly executed? Perhaps we are wrong, and do not understand the intricate subtlety of things which are deeply and profoundly whole, but we have a feeling that the damage done would not only be imperceptible to the eye of the viewer, but would go unnoticed by the heart as well. In fact, it is our sneaking suspicion that such slight imperfections, like the minute differences between two sides of a person's face, might only add to the beauty and the humanity of the whole. If, by looking at a building, we notice that it is a tiny bit off here, a little too low there, but otherwise right on the money, then perhaps it is this quality which is just exactly the personal feeling known in organic, evolving structures. Perhaps it is this roughness and lack of perfection that is the very thing which resonates within us, and causes us to look in and see ourselves—all of ourselves—not just one overriding personality.

Final Thoughts

We are not arguing for chaos, or for the acceptance of the craftsman's ego in the building work. But if mistakes are made—and they will be made—they are simply mistakes, and small ones at that. They are not death. Death only occurs when the process is strangled and overwhelmed by a perfectionist approach, and the spirit is forced out of a place. If Building Process architects can begin to delegate authority, we feel sure this will never happen. So long as the craftsman is separated from true craft, however, buildings with deep wholeness will remain an elusive goal.

Ownership and sense of place

Genevieve Urban

This project strikes me as very remarkable, and has great promise for the future. It is a most truthful account of a way in which people really— through their actions, feelings, and relationships — together make an environment in which they feel at home.

Although the project is tiny — some might even say insignificant — it is the level of human concern, subtlety, and day-to-day awareness which strikes me. As a human process this holds tremendous hope for the future. If the behavior, emotions, and the guiding sense of the arcitect as a warm, careful, guide, steering a group through the shoals and shallows of everyday life, to get a result, could be extended to a larger project then this, of all the processes described in the present volume — would be my choice for a model of what is most likely to create "belonging".

Introduction

Present processes of design and construction do not empower the lives of the people who create and inhabit buildings; people are secondary to the building. The architect often perceives building codes, budgets, personalities, and time schedules as obstacles and uses them as excuses to make a consumable object rather than an alive environment. Out of this assumption, relationships in architecture (architect- client, architect- contractor, client-contractor, building -user, building -neighborhood, building -natural environment) cannot be based in open, truthful communication. Questioning and listening to each other as individuals seems essential to creating a beautiful, responsive, alive, quality environment.

To create a more beautiful and human environment, a new process of designing and building

is needed. I set out to create a beautiful backyard garden that involved and empowered people on levels true to their humanity. How can a group of people be motivated to take ownership of their own backyard and make it a beautiful part of themselves? Through a three month process of participatory decision-making and hands-on experimenting, my house mates and I have created a beautiful alive small garden in our backyard. Additionally and perhaps more importantly, we have empowered ourselves and each other to believe in our abilities to creatively affect our environment and our lives. We feel we own the garden. We take care of it, use it and add to it. Each of us who participated in the process- of clearing the site, mocking up ideas, questioning our propositions, building and planting- see ourselves in the garden.

The process was rooted in communication among the 8 house mates and the landlord, Mr. Lena. These connections were a source of both richness and obstacles in the garden process. We all came to the project with different expectations- of the land, of work, of responsibilty, of architecture, of time, of cooperation, of beauty, of appropriateness, of ownership. Some house mates offered to help but did not commit to working, others committed all the way to making it happen. Issues of control and territoriality were parts of the process. Two people came into and three left the house during the three months. At first we saw this as an obstacle to the continuity of the project, but it actually proved our process' ability to embrace new people into the on-going growth. Through the process, every house mate did not agree with every decision. However, there was basic respect for a house mate's choice if it was authentic to their vision of the garden. In overcoming what seemed like obstacles, we built trust, ownership and a sense of place.

I guided and motivated. I kept the process moving when momentum lagged- (when new people moved into the house, when it rained on our planned work days)- and guided, rather then imposed, ideas. Our process was more about allowing than controlling. The results are successful on many levels: the

small garden, 800 sq. ft., is alive and welcoming. As a place, it displays the caring touches of many people, and welcomes future participation and continued ownership. The project created the framework for house mates to get to know each other and to build communication links and trust. In working cooperatively, we all learned experientially what it is to intend for a space to become alive and to make that real.

The project's wholeness lies in a careful reading of the parts, rather than in generalities or in stepping back to get perspective. In looking at the parts- at each contribution and finding the overlaps- the whole emerges. The garden neither represents the sum of our efforts nor is it something bigger than ourselves. In each person's contribution there is the whole of the garden process. Ben's process of designing the path- his openness, communication, frustration and persistence- mirrors the large process in the backyard, and the larger process of being alive.

The most honest way I know to share what we created is through the following journal entries I kept. They document our frustrations, joys and accomplishments as they evolved. I invite you to engage the process by reading and moving into the specifics to see the whole. It is a process of growth and communication, of ownership and empowerment that has merely begun.

▫ August 21

I want to make the backyard here at home into a usable and beautiful place. All three floors of the house look out on the backyard from balconies and windows- and what we now see is lots of junk, overgrown weed patches and neglected fruit trees. Old house mates put up a little patio, but nobody uses it cause it's plunked down in the middle of the open space. It feels exposed and not carefully placed. There's no reason to go there.

It would be really good to work collectively as a house on the project. Everyone is busy in their own lives, but the backyard is house land and we aren't taking advantage of it right now. David, Rene and Carolyn have been in the house for a while and I can count on their willingness. There are new house mates upstairs and downstairs that I haven't met yet.

I can't imagine anyone being against a group project back there where everyone could participate to make it a beautiful place. I'll bring it up with Mr. Lena.

Original state of the backyard.

▫ August 24

Mr. Lena is real supportive of the idea to improve the backyard. As landlord, he sounds pleased that the property will be improved but he also seems genuinely interested in involving everyone in the project.

I think the trust we have established over the past year and a half is key to his support of the project in the backyard. He sounds

Mr Lena.

open and enthusiastic about improving the backyard. He is, I realize, the true client for the project. I think the concepts of ownership and of home are very important in this situation. All of us in the house are renters and most do not consider this our true home. We are here on a short-term basis, so the time isn't spent to develop deep levels of experiences in the house, so it is rare to really feel a deep sense of ownership for the house. Given this, will anyone be interested in participating in a project to add life to our house now?....

I want to create a beautiful place to improve the house for us and for the future tenants. I need to communicate with the house mates to see where they stand.

▫ August 28

David.

Carolyn.

David has been here as long as I have been and also loves living here. He and Carolyn think it's a great idea to do something to improve the backyard.

I think they figure that since I am the one in architecture that I will design something and we all can build it. This is not at all what I have in mind. I talked about my ideas of a process that would empower all of us in the house to create this space for ourselves. I am clear that my role will be as a guide in the process, not an architect in the traditional sense of the one who pretends to be in total control of the process. I don't know how much this means to David and Carolyn; I don't even know what these ideas realistically mean to me...

▫ August 29

Rene says he'll help and that it sounds great to him, but I doubt this is connected to a true commitment to the project.

▫ August 31

I just made contact with Charlie and Ben who moved into the top floor apartment a few weeks ago. They seem real easy-going and open to a backyard project. Ben enjoys yard work, and Charlie loves plants. They plan to live at 1152 Keith for several years,

Charlie and Ben.

so their investment in the space is longerterm than everyone else's.

I am risking looking foolish and unorganized to really reach out to people in the house. I truly don't know what the backyard will become. I am trying to communicate that in a way that invites participation but also shows that I have a basic framework for the project. The responses have been overwhelmingly positive so far, though that isn't so surprising cause we haven't done any actual work yet!

▫ Sept. 2

I am troubled. The project has hit an unexpected, big and strange obstacle- Alex, Jesse and an iguana. The three of them moved in to the ground floor apartment with attitudes in tow. It began yesterday morning in the backyard when I introduced myself to Jesse and iguana. As we were talking I mentioned that the house mates were going to be creating a space back here that would be beautiful. I invited them to be involved. Jesse was lukewarm about the idea. As he was talking I asked if, by chance he considered the backyard their personal property. He replied, "Yeah". I said that never been the case here, and left feeling like there was a misunderstanding, but content that we'd at least made contact.

When I got home from school that evening, there was a big note on my door- "Call Jesse about the backyard!!" Jesse said that really it wouldn't work at all to be doing a project down there and that they were planning to make a garden there and that would be fine so don't worry. Through several strange and repetitive conversations with both Alex and Jesse, I tried to create alternatives like working together in the backyard and designing spaces to address their needs. They were incredibly inflexible. I spent the most of the evening trying to see them as human beings- and it was really hard.

It turns out that Alex considers herself an artist-type who works at home and can't concentrate with people "in her visual field". Not only was the project a problem but anyone going into the backyard was a major problem. They said if I put anything down there, they would rip it up and if anyone goes down there they would come out and yell at the person. The closest thing we came to a concession was

that if someone in the house wanted to go into the backyard the person could knock on their door and ask permission! Their troubles obviously ran much deeper than a conflict with me over the backyard.

I am feeling much more at ease today than yesterday. It really took me aback by how defensive they got over the simple suggestion that the backyard would become more beautiful. I realize how quickly territoriality can take hold- they had only been at the house for a week!!!

I talked to Mr. Lena today and he was confused and angered by their reaction. It's in the lease that the backyard land belongs to everyone in the house! And if they tear up stuff he's given me permission to put there, they are destroying personal property. And if they come out and yell at people in the house, that's disturbing the peace and the police can be called. He says he'll talk to them. It felt good to have him so solidly supportive.

I feel anger and pity for them. Alex and Jesse's selfish sense of entitlement could throw this process of participation into a warped orbit. I see clearly that this is a microcosm of how city-scale designs are derailed. In the "real" world, that kind of selfishness and defensiveness would be backed up with big money, egos and reputations. The building process would risk being diluted and deformed. And I thought incapable designers were all to blame for the ugly places in cities.....

▫ September 4

Mr. Lena says Alex and Jesse are very reticent to accept the truth. He has offered them an out from their lease. I was surprised to hear that since Mr. Lena is usually so forgiving. He gave me the go-ahead to continue planning and mapping the site. He told me to not hesitate to go down in the backyard. I appreciate his support.

I have also communicated with David, Carolyn, Ben and Charlie what has been happening and it has galvanized our energy! We are all in agreement that what Alex and Jesse are doing is so inappropriate to the situation! It's an unexpected thing that is working to bring our group together...

I have made invitations for everybody (including Alex and Jesse) to a brunch in the backyard.

I left the date open to see when people can get together. It will be this weekend.

▫ September 9

I began to document the feelings I get from the site. I am mapping the major centers I feel and the topography. Jesse came out to try to yell at me and I did not have anything to say to her. She eventually left me alone to work.

People are responding to the brunch invite. Looks like Sunday morning. I am nervous and excited cause it's becoming real!

Jesse and Alex are moving out! It's amazing to me that over their misunderstanding of the backyard as private land, they will leave. I have been thinking more about what is it to take ownership of something. It seems to me that it is to feel that something is a part of oneself- that one is willing to take responsibility for maintaining it and nurturing it. This can extend through all the scales up to taking ownership of the Earth. Alex and Jesse did not even own their own lives! I have no idea right now how I am going to create ownership in the backyard. I do sense that it will not come from me acting solo. It will be dynamic and collaborative. It is my goal in this project but it seems so elusive...

▫ September 11

We had the brunch today down in the backyard and it was wonderful! We each brought food and ideas to contribute. I had books on gardens, spaces and benches out on the table and we began by perusing these and brainstorming as we ate. Some people had never met each other or the backyard before, so it was an intense time of opening up to new people and places. I am really happy with the progress we made together.

We walked around the site- the shady section down the hill towards the canyon was a surprise to most people. As we walked, David jotted down ideas on newsprint.

-plants to give window privacy
-not manicured design
-swings, hammocks, bench(es)
-ivy, rock walls, terraces
-paths, gargoyles, goblins, wildflowers
-eradicate poison oak
-stairway down below
-deck to bamboo garden
-grass- green and rolling
-keep lemon tree
- ivy around balcony supports

These are the ideas we all agreed on. We attempted to identify the activities that we imagined happening there and generally where they would happen. For everyone, the backyard is imagined to serve as a restful space, that could also support some group activities from time to time. We came up with a variety of places to be: a grassy spot in the sun to lie and read on, a shady spot to sit under the tree, a canyon spot down the slope, a path, cared-for lemon trees, and water somewhere.

We agreed tentatively that Sunday mornings will be the weekly time to work. I am in a dual-role as guide and house resident. It feels comfortable and natural to not distance myself from these people I like and whose ideas I am trying to elicit. I am a part of the house and don't want to deny that. I am feeling like this is a first step. It sounded so simple to get a group of people together for brunch one Sunday, but now that it's done, I feel like it's a big accomplishment!

▪ September 12

I have begun writing up the ideas I have in proposal form:

Present processes of design and construction do not empower the lives of the people who create and inhabit built spaces; people are secondary to the building. Listening and questioning each other seems an essential start to creating a beautiful, responsive, alive, quality environment.

The backyard at 1152 Keith Ave. is being transformed into an empowering, inviting and alive place. The yard is to the south of a three story house in the North Berkeley hills, and measures approximately 50'x 50'. On two sides the undeveloped neighbors' backyards border the lot. On the third side, trees edge the site before it drops down a steep hillside to a canyon.

I and all the house mates are interested in creating a place where we can walk, sit and be. The design relates to the existing stream, canyon, slope, trees, sun and moon movement. The project *is not about creating a product* behind the house; the essentialness is the creation of a *process that allows and empowers* real feedback between built environments and people.

I am approaching the project as an opportunity to create

ownership on all levels of the design and construction. I aim to collaboratively create a process that empowers people to really get that it is their space- to live in or to neglect. I am taking responsibility. I cannot control anyone else. Yet, I can motivate people to become aware, and elicit participation. The jump to take ownership engages in a process larger than any individual involved. Allowing each phase to develop its wholeness is to be open to the unexpected and unspeakable factors that I do not completely control.

Ten Essential Features

- Open and honest communication among house mates and with the landlord. Based on trust already established, we will establish common understandings of quality and beauty.
- A balance of flexible spaces and built-in spaces. For example, allow some places where the ground surface is left to accommodate movable chairs, barbecues, tables, mats, sleeping bags, etc. and some places where the chairs, bench, table are fixed in place.
- Cooperative construction work within the house. Share the responsibility between people who are interested in being involved.
- A low-maintenance environment that reflects the fact that all the house inhabitants are renters (no big sprinklers needed, minimal weeding).
- Respect for the need for privacy in the ground floor apartment — but allow a view out.
- Awareness for the direct visual connection to the site from the upper house floors and from the neighboring homes.
- Materials from neighbors' and landlord's scrap piles. Use local, recycled, materials.
- Incorporation of existing neighborhood deer, cat and kid activity. No need for fences.
- Careful alignment with centers already existing on the site. For example, the line of trees leading down to the stream.
- Assurance that the design will incorporate the landlord's ties to the site. His father built the house

We are creating a process that invites continuous open

involvement. It is more about discovering than planning, more about allowing than controlling.

My role as architect and as a resident in the house is to start the initial momentum of an unlimited process of engagement on the site. Like the process of breathing, we need a process that will invite continuous open involvement. I imagine a component of continuity over time. But how can I assure that continuity without controlling the essence of the process which is freedom? The landlord is a constant and involved presence at the house. A house manual could be written (and updated) that would explain the process up to then of the backyard's growth. Everyone involved would record and share their experiences, motivating others to continue. A segment of the manual could be attached to the lease. But will anyone read it?

This hard issue of how to create a process that is bigger than me- that grows on—-similar to parenting- that could motivate the many next tenants to empower themselves by participating——-that is more about discovering than planning, more about allowing than controlling———this is the essence of what I am aiming to address.

I will evaluate the success of the process through interviews with people involved in the design, construction and using of the backyard. I will record how they feel the process went and what its chances for continuing are. I will also spend time watching whether people are using the spaces, and what they do there. An evaluation of the longer term continuity will be beyond the time of the official project, however, it is the true objective.

▫ September 18

My role as guide mainly involves keeping continuity and maintaining momentum in the project. We cleared alot of the site today. We moved alot of junk out and Charlie went to town on the lemon tree.

Not everyone was there- and I feel frustrated by that, and unsure how to act. How much do I encourage? How much is it my responsibility and how much is it individual choice?

The work with Ben, Charlie, Mr. Lena and Carolyn was good and we talked as we worked about ideas we have for the spaces. We

Charlie pruning the lemon tree.

laughed alot and drank lemonade made from the newly pruned lemon trees.

▫ September 25

Today we took apart the old patio and leveled out the land. The earth has alot of clay in it so it's hard to work. This week we put chairs out on the site to begin feeling where we want to be. This hasn't gotten lots of action. I am realizing that this garden needs to function on several levels simultaneously. It will be seen from above by people looking from the two upper level balconies. In addition, it will be looked at from the ground floor apartment that has a floor level 6 feet above the ground. It will also need to function as a garden to walk through and experience at eye level.

The site is getting clear enough so we will be moving into mock-up phase. Chris came to visit and encouraged me to move fast on the mock-ups- use any material and create spaces that feel good. He supported me remaining open to ideas from everyone but cautioned against "idiotic democracy" - where people think they have all the control and what they want goes. He said to get input and not let things get fixed- keep my vision of the whole.

▫ September 28

I am writing invitations to everyone signaling that we are at mock-up stage and that it's time to put ideas into space! We are aiming to get together this Sunday morning.

▫ September 29

David will be out of town this Sunday so he communicated to me ideas he has for a bench under a lemon tree.

Carolyn will be moving out of the house cause she has gotten

clear that she can't stand the lack of light in her bedroom. Is this somehow connected to the work we are doing in the garden of really questioning for ourselves what it is we truly want?

▪ September 30

I made banana bread and took some up to Ben and Charlie as a neighborly thing. We got to talking about the backyard. Ideas about planting and paths evolved naturally from the encounter. It's a very different relationship than if I were a typical distant architect. I believe these neighborly connections build communication and trust. The quality of the project is enhanced by treating the people involved as individuals. Plus it's more fun!

▪ October 2

We began mocking up ideas today. Ben voiced concerns about why we were going on to the next stage when we hadn't finished clearing. We talked about how the process is fluid and can allow us to keep clearing the site while we discover through the mocking up.

Mocking up our ideas was a new idea to everybody, me included. But people got into it and now the backyard is filled with organized junk! We used old carpet for grassy areas, hoses for the path, cinder blocks, plywood, rebar, bricks, stones, old timber....Today Ben tuned into the land and ran around with the garden hose, saying "Yeah-I see it!"- creating a wonderful curvy path cutting through the site! It is our active creation out there!

I asked Ben and Mr. Lena what they were feeling about the process so far.....

"The project's going really well. I am more encouraged the more I see it- like 'wow! This can really happen!' One of the essential elements to making something happen is to first believe it can, then to want it to happen, then you start to see it transform! You say 'this is possible and it's really going to work!' And you start thinking of all these ideas. You are really good about defining the phases so we are working on and thinking about certain aspects of the job. It really helps to get us focused. Like knowing the clearing is an on-going process- and planning, developing and feeling the land go along with that. I think we are doing really well. I am really proud of what we have done!"

- Ben

"First of all, you've all done a great job clearing it out back here! It looks like you've got possibilities of arranging things in the shade and in the sun...There's

Before.

an attractiveness to the earth mounds, in having it uneven. Very flat and very rectangular, very predictable and very straight are not really attractive in this area of town...Use what is here to your advantage. Keep it fluid and not too permanent. Keep looking for materials as you are planning and building- it's not separate!"

-Leland Lena

▫ October 3

I talked with Charlie today. He was shy to talk yesterday. Here's the feedback I got from him....

Now.

"It's really neat to see the progress from the backyard being so out of control to now being a foundation we can build on. The space is really idyllic- we can do what we want. We are building lots of variety in. I think the plans are sounding great. There is potential for open space and seclusion. I love how the project is adaptive.

We are adapting to the landscape rather than submitting the land to our project. I love to think of the plants we could have back there."

▫ October 4

I caught David on the fly- here are his ideas...

"I think the backyard is definitely on its way and it's looking good! You've been good about soliciting and using opinions and coordinating everyone. I am not usually organized enough to spend much time in any one place, but it's going to be a place where people can go to read the paper- and I'll be drawn there!"

Carolyn said:

"It's in the early stages. It's alot cleaner. I'm really hopeful- I love being back there and working and participating. It's a long process and the change is happening. It looks really promising! We are really lucky to have a backyard and we are making the most of it!"

▫ October 6

I am proud of how the backyard is going. We all are really sensing it is possible and getting with it. It seems like such a normal thing to get a small group of people together to care about their backyard. But, it's actually unusual and tricky to have people work together and care about their common environment. We are all learning from each other and from the process as we go- that's the best part.

I have lots of questions- Does everyone in the house have to be involved? Should I be working only with the people who are most interested? One of the house mates, Rene, has held back from participating. When I talk to him I get that he thinks his input is not valuable. I invite him to participate, but he still holds back.

Carolyn's commitment to the project has changed. She is still helpful, but not truly interested in taking ownership of the space since she is moving. The new downstairs neighbor is coming in this week and will be entering the process at the mock-up stage, with unknown attitudes toward the process.

At this point in the process, I am more aware than ever of the importance of participation and taking ownership of our spaces. However, I am questioning how to truly empower anyone including myself.

I feel the leadership in guiding the process- in listening and providing alternatives- rather than designing on my own and dictating. The choices in the backyard are made based on mutual respect and curiosity. Often the decisions we make are not what I would have done on my own. Letting go of a need to control is directly related to the crazy and brilliant creative ideas that flow whenever we get together in the yard. My role becomes more like a guide rather than a designer that decides and implements. I am finding that to be open and to actually give up the idea that I know, as an architect, what is best for anyone else, is closest to the source of creating meaningful spaces.

We are creating a process that allows for flexibility, hands-on decision-making and participation, that is rooted in materiality and keeps momentum with a sense of progress even with obstacles along the way.

The fundamental stuff is that it is real people affecting change, deciding for themselves and taking responsibility of their environment.

The budget is set at $500. This will mostly be allocated to planting materials- soil, fertilizer, sod, bamboo, a dwarf fruit tree... It will also be used to buy a small amount of treated lumber. Mr. Lena already has a large stock of excellent wood that will become benches and retaining walls. All of us in the house are committed to using recycled and found materials as much as possible. Given the resource support from Mr. Lena, I feel that $500 is adequate to accomplish our goals.

▫ October 11

I get the sense that people really see that it is possible... It seems like such a small thing to get people together and care about their backyard. But it is hard to empower people to believe in themselves and in their right to choose and to act.

I am also questioning my own training. What is it to design spaces? I am building skills in this project like listening, risking honesty, not being afraid to fail...How can I think I know what I am doing? This is a new process- and I still sense doubts about whether it is going fast enough, good enough. I am putting trust in the unfolding of the process of communication and collaborative building. It is hard sometimes to

stay open to the elements in the process that I don't know and can't identify. For instance, why does Rene hold back on helping? Will this really become a beautiful alive place?

I invited everyone to take a part of the site that they really want to see happen and begin to make it real in their minds. How would it be made? How would it relate to the rest of the backyard?

▫ October 13

I notice little shifts in the mock ups. People are moving them around as a way of trying out their ideas. It serves as a way to communicate with the other house mates when everyone is too busy to sit down together at once.

I have concerns that the final product will be too cobbled together. That these parts will not add up to a whole. Chris says this is nonsense, a place created by someone who has put love in it will be appreciated by anyone who discovers it. Where does coherence come from? How much control- when in the process? Trust- risk.... Letting people do their own thing. What is a good process?

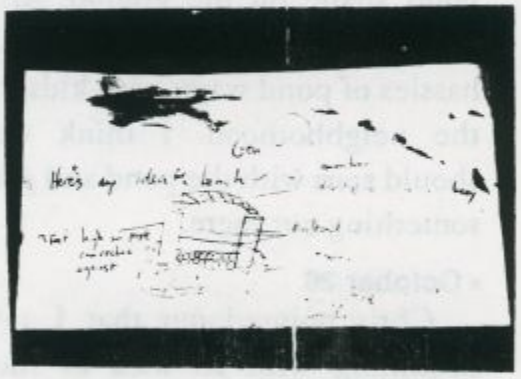
▫ October 19

I am feeling like people now want it done for them. This is where my work of motivating really begins. People are moving in and out of the house more than I expected. The new downstairs neighbor is here- Teresa. She is not often at home. Carolyn is gone and Rene may leave. Ben had family reasons to be out of town for a week. This project is not everyone's priority. I want it to happen...I think I need to get clear where people are with their commitment to the project.

▫ October 22

Met Teresa and she wants to make a pond! David gave me a drawing for his lemon tree bench.

He's so busy with school that we talked about the project and his bench design as he was shaving



David's bench design ideas.

David on the bench mock-up.

this morning! I feel like our ideas are so ripe...Got to just get moving now!

▫ October 25

Teresa and I laid out a basic pond shape on the ground. Mr. Lena has doubts about the legal hassles of pond water with kids in the neighborhood. I think we should start with the pond and get something out there.

▫ October 26

Chris pointed out that I am beginning with an idea of the newest person to enter the house. He said that if I did that the process of trust built up in the house would erode. Maybe noone would say too much, but it would be like a new lover came to town. Once he said that I saw how foolish it was. But I really want something to get going out there. The pond is not the way.

I will motivate and empower the original participants first- David, Ben, Charlie. The newer people will be involved but within the framework of the existing decisions.

I am nervous that people have changed their minds somehow and won't be willing to make this real....

▫ October 27

I talked with Mr. Lena about wood and went to Home Depot to buy bender board. I feel good moving into this. I am tempted lately to just do it myself.

▫ October 28

Ben is back and he and Charlie are fired up to get the project happening! They are the people in the house most likely to be staying for a while and I think that increases their level of engagement in the backyard. They are also very engaging

people in general and I see them participating actively in their lives.

▫ October 29

Charlie and I had a great trip to two nurseries and a salvage place today. We bought a pink jasmine plant and a purple bougainvillea. The bougainvillea will go in front of the tool shed and grow up the poles that support the second floor balcony. The jasmine will go at the entrance to the garden- Charlie has a great idea to use an old steel wheel flat on legs to mark the entry and to train the jasmine around it.

I love the ideas that come out of being open to the unknown! I never would have thought of a steel wheel as an arbor!

▫ October 30

Whew! Big day of work...Ben, Charlie and I worked the land- that acted like rock- with pick axes to loosen it up in anticipation of the sod grass. While we were digging, Ben said that we will know every time we lie on the grass what went into putting it there! Charlie planted the bougainvillea and it looks great! Ben and I put in the first bender board!! The yard is beginning to look good!

Today, the sense of accomplishment is so much more than the physical actions! It was us all talking and being together. Ben and I had some incredible

Charlie planting.

Ben laying bender board.

conversations about relationships and courage as we dug together at the earth. He said he really appreciated how I was handling the project- which for him is all about discovery. He said he is glad to be constantly reminded by the process that it's important to be open to what is not known... Like a person, this process is developing as we all flex. As we were putting the bender board in we were discovering and inventing since neither of us had ever worked with it before. We created some effective and beautiful ways to lay it in gentle curves. This empowered both of us!

Ben had an idea to put a fence in at the entry. He said "Yeah, we could have plants growing on it. It would be a living gate into the living garden!" We all had a big brunch together upstairs...

This project is a place- time- space- activity- process that engages! Today more than ever I really got that the backyard product is not at all the goal- it's really the tool for creating these human exchanges. Working and eating together- it's a chance to share ideas. And actually, it's a process of creating relationships!

David and Rene don't get that they are denying themselves empowerment and engagement and joy by holding back.... David is busy and I respect his priorities. It's hard for me to truly understand why he doesn't care about his own backyard. But maybe he doesn't feel it is "his own"...I'll ask him.

▫ November 3

Said hi to Brendan, the new house mate on my floor. We had a great conversation about communication and he is interested in being a part of the backyard. I am trying to encourage him to jump in. There are not many decisions that are truly set yet. I think he got that his input is valued here.

David said he remains real supportive of the project but does not enjoy yard work. I respect this choice. It broadens my ideas of participation.

I have been thinking more about what ownership is and how it can be created. To take ownership is to open up to taking responsibility for your self (and what one feels connected to). That then questions how we think of our selves and connections?!

The environmental movement is about taking ownership of

Earth...and caring for it as if it were our very selves- which it is! Why are these links/ connections so often discouraged?

▫ November 4

I've been working the earth where the sod will be. Big difference- added 4 bags of soil amendment. Ready to roll!

I sit out there and feel really peaceful and proud of what we all have created. Teresa asked me to take care of her cat this weekend. I think the project was the reason to begin her's and my relationship of trust and listening.

▫ November 6

It poured rain today. This is frustrating. Ben is on vacation this coming week and he's up for alot of work.

▫ November 9

It rained today, so Ben, Charlie and I went to Home Depot to get supplies. We got retaining wall supplies, steel wheels for Charlie's arbor, and looked into sod grass. Over pizza, we voiced how we are moving forward and having fun! It's a great reason to spend time together!

▫ November 10

I spent time building the 25 ft. long retaining wall today. It respects the slope of the land and defines the edge of the to-be sod area. I sit out in the backyard and feel good energy. A safe place. An alive place. A place humming with overlapping input and care. It is becoming a place to be. I am anxious for the grass!

▫ November 11

Ben and my friend Michael set the posts in concrete for the retaining wall.

-photo: "Setting the retaining wall posts"

Charlie and I put up the wire for the bougainvillea. The big thing today was that the grass is on

Setting posts.

the ground!! Ben and I spent all day getting the sod. 65 pieces took two trips in the car- the second trip we had the back completely filled and 15 pieces on the roof! Ben and I laughed alot together and spent a great day working and learning side by side. It looks great! We finished at dusk and feel proud of what is becoming.

We experienced the immense amount of time and effort that goes into the preparation and transport for a job. It only took about an hour to actually lay the sod, but it took many hours to get the sod to the site and weeks to prepare the earth. I was very naive about the weight of 65 pieces of sod and of the time it takes to transport them. I expected that laying a sod lawn involved making a run to Home Depot to pick it up, like a load of groceries, and laying it out. I understood "doing the job" as the laying down of the sod rolls on the dirt in the backyard. I realized today that the sod unrolling is a tiny minority of time and effort compared to preparing the earth and getting the materials to the site. I am fascinated by process and still, previous to today, I expected the end product at the expense of the process. This is an incomplete understanding of how the world works and how things happen!

Sod on the roof of the car.

First sod pieces.

Most people are not aware of process. We take for granted the existence of things and spaces

Sod in process.

around us- whether it be packaged food at the grocery store or architectural services! The process is not valued enough to share typically. And, most people are not interested it. Someone may visit our backyard and truly feel alive in the beauty and wholeness. However, they will have very little idea of the process- not only because they did not lift 65 pieces of sod, but because we don't have ways of talking about and sharing our processes of exploration and creativity with each other. This journal is an attempt at this level of communicating. It seems at times so personal and particular to me that I wonder what it will say to anyone else....

▫ November 13

Ben and I got down a beautiful final curve for the path in the bender board! His ability to tune into the land and that path is inspiring!

My friend Michael was over to help and placed a log in the ground at the corner to hold the edge and as a place to sit. We all agreed it felt

Ben and me on the lawn.

Ben tuning into the land.

right. Brendan came down and laid out the logs as he felt right. My friend Sean wanted to be involved. He came over today and helped set the posts for Charlie's steel wheel arbor!

It was great energy in the backyard! People putting themselves out there to create

The arbor in process.

places that connect with their authentic ideas of being alive! The momentum is high right now and it's exciting to be in it! Brandon is jumping in without being frustrated that he wasn't here for the whole process... David and Rene have divorced themselves from it, but I can tell they can see we are having fun out there. I am encouraging them to join in!

Over and over I experience that letting go of control and responding to what is happening at the moment is an effective way to communicate and design. The ideas that emerge when I am not trying to do things "my way" are extraordinary! Like the steel wheel arbor. We will be planting the jasmine soon. It feels so right there...The garden is coming together as a conglomeration of our ideas in respect to the whole. I think we will all be able to see ourselves directly there in infinite connections.

▫ November 14

Charlie put the jasmine plant in on his own today- it looks great climbing up the arbor! We are getting better ideas of the plantings we want. It's a great thing to treat the site as a giant model to experiment with!

I got home from school tonight at 10 and was watering the sod. Charlie, Teresa and Brendan all came out to join me and help water and chat! It's amazing how the place is an endless opportunity to interact! A context for activity and

being- an invitation to relate to nature and to people!

▫ November 20

Mr. Lena is real pleased with the way the garden has become. I appreciated his support through the entire process. He really pushes me to explore and discover and communicate!

Heidi, an across the street neighbor, came over today. She, Ben and I chatted as we watered the lawn. She said she never would have imagined it was so comfortable and beautiful in the back yard. She liked the path layout and the lawn shapes intertwining.

It felt good to share the garden with a neighbor and get her positive feedback! I sensed that in some ways the backyard is able to reach out and communicate and inspire people outside the house.

▫ November 22

Tonight Ben and I went on a late night run to Home Depot to choose the kind of gravel we wanted for the path. We knew we wanted small natural shaped rocks, rather than marble gravel or lava rocks. We choose Blue River rocks, which are naturally multicolored and rounded, to suggest running water along the path.

We loaded up 15 bags and the car rode low. Again we were struck by how much we underestimate the transport issues.

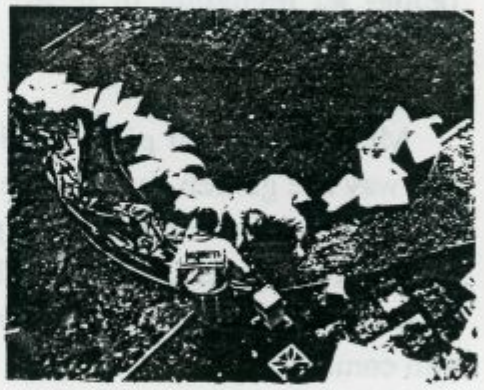
In the car we talked about the process so far. I brought a tape recorder on instinct that Ben and I would get into it. Ben said: "Like the path- that is listening to the land. It's such a difference from having a landscape architect come in and say "put this here and that there". I'm sure that could look nice, but it would not be like our on-going process that self perpetuates itself- that is bigger than Gen or Ben- that continues to evolve simply because it is alive!... It's OK that not everyone was actively involved. You can offer up motivation but whether or not

Blue river rocks.

people grab hold of it and come along is totally their choice. It's like trying to control people's emotions. We don't have control over anyone else. We can play a part in their feelings, but if it's not there for them, it's not there for them!... So much has to do with us just being present and listening to what nature is saying and being willing to express ideas...My challenge is to give up control. I know I feel so much more free and alive when I am not trying to control, but it is so fearful! That is one of the things I really like about the backyard- it hasn't been a controlled process, although it's had order"...

▫ November 25

I invited my friend Michael and his sister to help lay the gravel path. I was confident that the process and the garden would not exclude their participation. This proved to be true. We loaded up the car at Home Depot with gravel and lugged it to the backyard, discussing the project as we drove. Writing that makes the transportation sound almost effortless- just like I had envisioned it would be. The concept and the reality are totally different when it comes to transporting thirty eight 50 pound bags of gravel by hand.



Laying the path.

After the sweat of the whole ordeal of bag by bag loading into the car and getting the gravel to the site, we entirely enjoyed pouring the gravel in between the bender boards and watching the path become!

The joy of walking on the gravel path was more intense for our intimate participation in the process than if the gravel had been delivered.

Michael's sister thanked me several times for inviting her to work in the garden. She said she was in a depressed mood beginning the work and by the end was feeling much more happy and alive. Even though she did not have any active input in any of the major decisions, she felt there was a place for herself to be received in

the work and garden spaces. She is there in the gravel around the plants, and the path's existence. When I said good-bye to her, she said sincerely, "I hope I can come visit the garden in a year or two and see what it is becoming."

▫ November 26

I worked on backfilling by the tree. Val, from across the street stopped by. She liked how the yard "borrows landscapes" from the huge eucalyptus and redwood trees in the distance. It was impressive to her how each thing in the backyard was a different person's idea, yet the space still welcomed her as a whole. She took me on a tour of her edible garden and told me to take any clippings I wanted. She gave suggestions for which plants she felt would fit well. This is her contribution to the process!

This afternoon, Rene sauntered down in the backyard and said "It looks good." We chatted some and he went upstairs to work. A few minutes later, he called down to me from the balcony, "Hey Gen- how about some spaghetti?!" We had lunch together and I thanked him for the meal, as his support for the project.

▫ November 27

I feel so proud of what we have done. I feel entirely that we did it together! It is not my project. Taking ownership is not taking possession. Ownership is shared and bigger than anyone's want to possess. And I feel like it will grow over time. Having Brandon come in a month ago has been an experience in how our process can indeed continue beyond our original group of tenants. But, since Mr. Lena vetoed the pond idea, Teresa has kept a low profile.

▫ November 30

This Sunday- many Sundays from our first brunch in September in the run-down backyard- we will have our last official work day and our garden celebration on the green grass, looking at the first purple bougainvillea blossoms! I feel proud for having started this and quite humbled that it quickly became bigger than me to grow beautifully on its own.

I wonder how this process could be applied other places. On small scales it seems very appropriate. I remember Alex and Jesse- it's hard to build together without a certain mutual trust. Maybe on large scales, exercises to

build trust and communication skills among participants could be developed... The larger the scale gets the less it would be all the individuals having active voices in the process. It could work with carefully created committees... We all are clear that our garden project is unique to the people involved, all the circumstances and the land. However, our process of participation and ownership is about discovery on all scales.

Our garden now.

Conclusion/ A process and a journey of discovery and development

During the past three months, we shared our day to day lives with each other and created a place to be in the world. The garden is an expression of joy and discovery. In the curvy path, in the lemon tree bench, log steps, and plants, people are present in the spaces even when the garden is unoccupied. By being present to listen to each other, the land and our humanity, we collaborated and shared in empowering and enlivening ourselves and our environment. The garden process has no set end point. It is/was/will be fluid and open. Thus, here in a "conclusion", there are few answers to pin down, yet many ideas and questions to share.

Not everyone in the house fully participated in the garden making. Is this a failure in a process about engagement, community and empowerment? Cooperation does not necessarily mean everybody actively must participate. The process worked as true communication between people who were willing to move past fear, to risk exposing their humanness and respond deeply and honestly to the land and to each other. Everyone engaged the

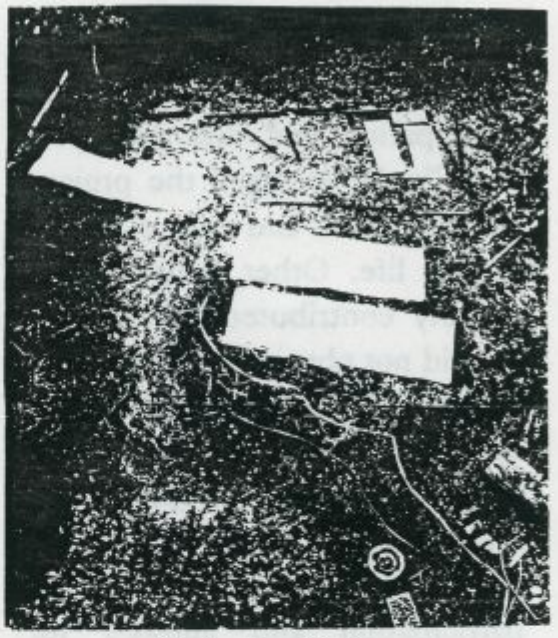
process. At the extremes: Alex and Jesse reacted vehemently against participation and dialogue; Ben and Charlie engaged the project on deep levels and truly gave the garden life. Other house mates actively contributed their ideas, yet did not physically work in the backyard. One house mate did not contribute to the project. Instead of controlling people and manipulating their level of contribution, the process inspired participation and allowed for individual ways of contributing or not. The freedom to choose levels of engagement gave the process and the garden depth, continuity and life.

Beyond the particular individuals involved, the essential is that we treated each other and listened to each other *as* individuals. The sense of belonging- having a place in the process and in the garden- springs from being present to experience the truth of the site and of other people at every moment. It was hard to stay present and not pull back to try to "get perspective" and control the process in subtle ways. We jumped into the specifics- of materials, of planning, of communicating, of logistics- and created a sense of belonging in each part.

We did not treat the garden as an end product. The normal habit of relating to the environment as products increases our aloneness. We each have a sense of our own process- our mistakes and our accomplishments. If we do not share these and only judge each other and ourselves by the "end products", we do not feel deeply connected to others. We do not know if anyone else has tried or failed and learned. We are alone in the mistakes we make and we try to hide these under socially acceptable veneer. This is away from the truth- true beauty, communication and happiness. This garden is a particular situation where people came together to communicate and enliven themselves. Most everyone involved now has an increased awareness of the process of affecting meaningful and real change in their lives. We are empowered to be open to ideas other than our own and we have expanded what we feel ownership of in the world. Our selves are more open to discovery and more alive.

I do not know how far the insights we gained- about communicating and being in a process of discovery together- can be projected. Traditional processes of designing and building produce emotional and physical environments that are less than completely alive. A $10,000- $1,000,000 project can and must build human connections and incorporate listening. But is it possible on such large scales to keep the honesty this small garden process sprang from? This challenges current ideas of process- as predictable, knowable, and inherently controllable.

Our garden is small but not insignificant. We created places and occasions to interact with others on levels true to our humanity. The spaces are beautiful and living explorations of trust and creativity by alive people. This conclusion is not a closure. It is an overture. Like Ben said about his path that widens as it runs off into the woods : "Nature is vast, so the path has got to widen to open to all that."



The Backyard Before.

The Backyard Now.

Ben's path.

Tiles And Walls
Integral Concrete Tile Formwork

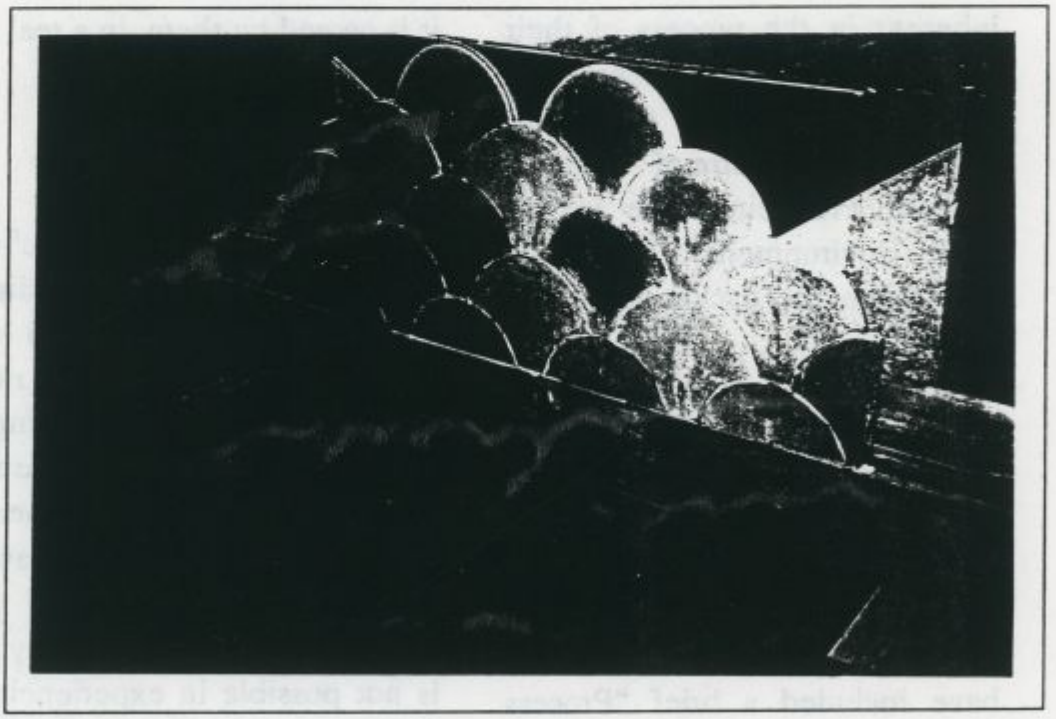
George Elvin

In the following paper, Elvin presents a very beautifully worked out system for building masonry walls with an emphasis on the beauty of the wall.

He starts with the assumption that he wants to make a wall with feeling in it: and proceeds to go through a variety of mock-ups to define the shape of the elements. He then describes the way in which he has met the various technical problems existing along the way; many of them have been solved, in the very short time he has been working on this project.

The larger meaning of his work is less clear. He has succeeded in developing a wall system which works, and which makes — I think — a truly beautiful wall. He has also managed to work out tentative answers to obvious detail problems which occur at the edge of window openings, door openings, corners, the base of the wall, and the top of the wall.

What is not yet clear, is the extent to which this wall, beautiful as it is, helps to achieve that harmonious degree of adaptation that exists in "organic" buildings. The technique he has developed might even be accused, in its present form, of falling prisoner to an over-technical and modular approach to building. The rough and ready smoothness of adaptation that exists in traditional structures — and which allows them to achieve their macroscopic harmony — is not yet to be found in Elvin's system. It is to be hoped that a Mach2 version of his approach will contain this feature. But there is, in me, a nagging doubt which makes me worry that the whole idea of the wall, as he has presently conceived it, goes against the possibility of this subtle, fine-scale, rambling comfortable adaptation of parts and elements within the building — and therefore between the building and its inhabitants, and its surroundings.



The Ginkgo tile wall.

INTRODUCTION

My goal in building the Ginkgo Tile Wall has been to define a process for making a living part of the built environment. This article is a way of articulating that process and opening it to discussion, criticism and experimentation. The way of building outlined here has led to a construction system, the integral concrete tile formwork, which I believe has some spark of life that is not normally present in construction systems employing standard processes. The emphasis throughout this article is on process, with the Ginkgo Tile Wall serving as a case study in its implementation.

I begin by describing the spirit of life in architecture and how this spirit is dependent on process. A brief description of current standard building practices gives us something to compare this system to, including a more in-depth look at one particular system, Frank Lloyd Wright's Usonian Automatic block wall. This comparison includes 10 problems with the Usonian Automatic blocks, possible causes

inherent in the process of their design and production, and possible solutions to these problems in the form of "10 Steps Toward Producing Life in the Built Environment". These 10 steps form the backbone of this article.

In the section, "New Construction Methods Producing Life", I elaborate on the 10 steps, spelling out why I believe they are important and proposing specific acts for their implementation in the design/construction process. I have included a brief "Process Diary" about the making of the tiles, and close with an evaluation of the impact of these steps on the form of the finished wall.

The Ginkgo Tile Wall is an experiment in producing life in the built environment. In making the wall, I was struggling to answer the question, "How do we produce a wall that you and I can have real feeling for?" This paper is an argument for one process which is aimed at producing this genuine feeling in us. "The crux, throughout," as Christopher Alexander describes it, "is that this will produce a bit of the environment to which people feel more deeply related and feel that it is owned by them, in a real and emotional sense."

The Spirit Of Life In Architecture

What do we mean by "life" and why do we want it in our buildings? People look at the small wall experiment and have, in many cases, a deep and direct feeling for it. This is a different response than I have observed when people respond to a design in drawing form. People seem to feel connected to the wall in a way that is not possible in experiencing a drawing or model. In the shop, people have even joined in the work of building the wall without being asked.

I believe that this kind of response has something to do with a connection between our own nature and the nature of space around us. The great goal of architecture is, I think, to bridge between self and space and, in a sense, make them one. Louis Sullivan put it this way in "Kindergarten Chats":

"There can be no doubt that the most profound desire that fills the human soul, the most heartfelt hope, is the wish to be at peace with Nature and the Inscrutable Spirit; nor can there be

a doubt that the greatest Art Work is that which most nearly typifies a realization of this ardent, patient longing. All efforts of the body, all undertakings of the mind, tend, consciously or unconsciously, toward this consummation, tend toward this final peace: the peace of perfect equilibrium, the repose of absolute unity, the serenity of a complete identification."

The Value of Process

Why is process so important? It could be argued that "life" as a characteristic of form could result from inspiration, genius, luck, or any number of other factors which are not process-dependent. Certainly, these factors have, at various times, resulted in buildings which people feel connected to; but as an architect, I am more interested in learning a repeatable process which can help me as well as others to create buildings with this quality.

Formal analyses of architecture, the usual approach to understanding building quality, too often ignore the fact that quality (life) is a process, not a product - that it cannot be somehow added on at the end if the process itself does not hold quality as the goal at every step. The biological model, in which form is the inevitable result of the generative process (rules) latent in the genes, is just one example of how form is really completely dependent on process.

Why don't we see process paid more attention in architecture? Vitruvius wrote on "Methods of Building Walls", and Viollet-le-Duc, "The Construction of Buildings", but for the most part, architectural theory dwells on form independent of process. Durand's Beaux Arts kit-of-parts, Le Corbusier's 5 points, and Krier's Elements of Architecture are just three manifestations among many of the shift from processual analysis to formal analysis in architecture.

Construction remains, in most of contemporary architectural theory (and practice) a sort of void between design and built form. This must result in no small part from the lack of experience with the building process on the part of those doing the writing. This is nothing new; Leonardo Da Vinci sa*id of "men of letters",*

"They go about puffed up and pompous, dressed and decorated with the fruits not of their own labors but those of others, and they will not allow me my own. And if they despise me, an inventor, how much more could they - who are not inventors but trumpeters and declaimers of the works of others - be blamed."

Christopher Alexander and his colleagues have put a renewed emphasis on the building process. Students in their courses at the University of California at Berkeley learn a way of building grounded both in hands-on construction and in deep, direct feeling as a way of understanding architecture. Most of these students, however, have experienced great difficulty in applying what they have learned once they dive into the mainstream of architectural practice. The work described here is part of the emerging field of Process Studies, which is, in its essence, a body of work aimed at implementing building processes which can create a living architecture.

Construction Methods And Building Quality

Critical Factors in Construction

In my dissertation I am analyzing current methods and proposing new ones which can improve building quality. In this paper I propose and test a specific construction method, the integral concrete tile formwork. In general, construction methods can be defined by certain critical factors which, because of their impact on the process as a whole, represent the most significant elements of construction methods.

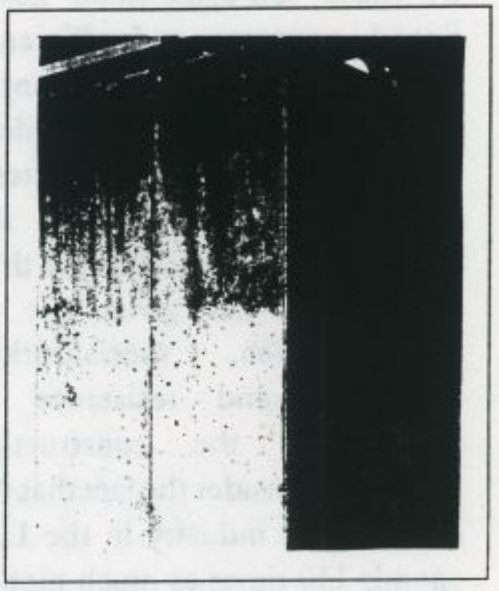
▫ Critical Factors In Construction

- Organizational Structure
- Roles and relationships of parties involved in construction. For example: architect, construction manager, general contractor, etc.
- Contract Type. Nature of contractual agreement between parties, i.e. lump sum, guaranteed maximum price, etc.
- Financing Plan and Spending. Schedule of payments, constraints imposed by lender

(progress payments, inspections, etc.)
- Materials and Methods
- Construction materials and systems (for example, platform framing, balloon framing, timber framing)
- Estimating, Scheduling and Controls
- Methods for measuring time and cost performance with respect to expectations
-

These factors establish the structure or framework of the construction process. The particular characteristics of each critical factor in a given construction method determine the extent to which that method will be capable of producing life. The components of any system operating within the "mainstream" of first-world construction will have certain characteristics in common with other systems within that mainstream. For example, it is standard building practice in the U.S. to separate design and construction. A construction method which seeks to combine design and construction automatically establishes itself outside the mainstream and encounters economic, political, and even philosophical resistance from the center.

Many of the characteristics shared by mainstream construction methods, separated design and construction among them, make it inherently difficult to produce real feeling in the built environment today. Specific to the concrete tile project, consider the conventional plywood form systems used in concrete construction today. They are wasteful economically and environmentally and they tend to produce undifferentiated forms without meaningful levels of scale or detail.



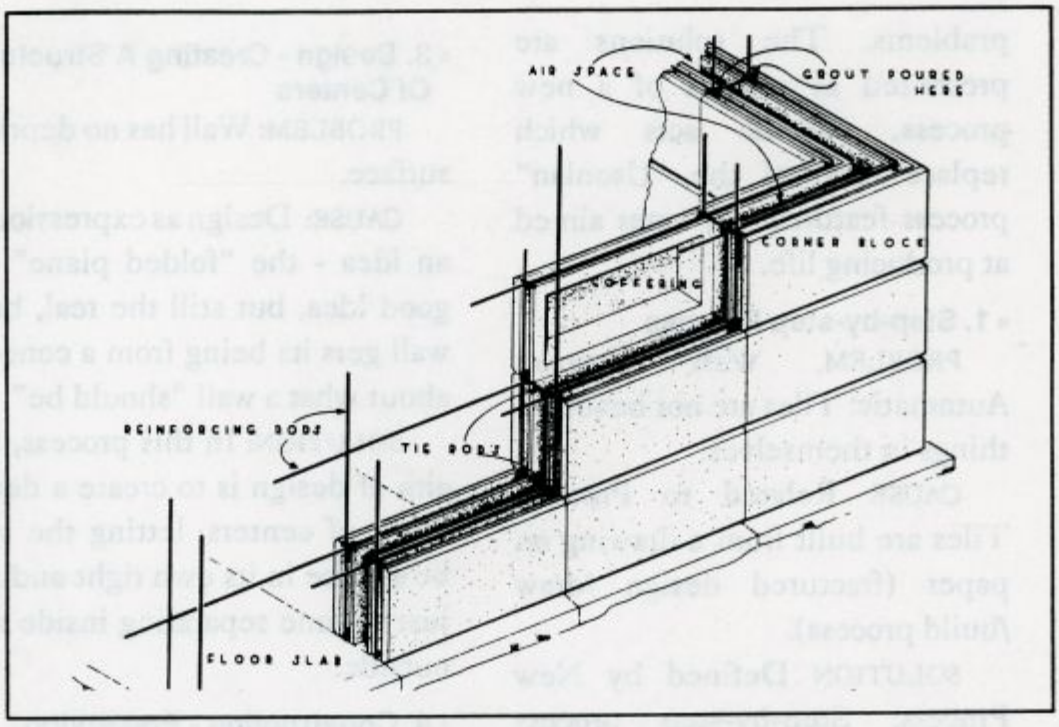
Typical poured-in-place concrete wall.

What general conclusions can we draw about standard building practices and their impact on building quality? What failures do standard methods necessarily cause? What successes do they negate? Standard methods tend to have similar goals. The striking thing about these goals is that they are bounded completely by the project definition provided by owner and architect. If the project is completed on time, on budget and according to the architect's drawings and specifications, it is considered successful. This is a definition of building quality entirely independent of value.

The means and methods of construction, then, are determined by these self-established goals. Speed, economy and efficiency have become essential characteristics of any modern construction system. Unfortunately, the understandable desire to save time and money has given rise to standardization, specialization, repetition, and resistance to change in the construction industry. Consider the fact that the construction industry in the U.S. spends 150 times as much money on litigation as it does on research, and how the fear of litigation inhibits innovation in construction, and you can see that the cards are clearly stacked against methods that do not share the goals of the mainstream processes.

The goal of this project is to produce a beautiful concrete wall. I believe that with the Ginkgo Tile Wall I have succeeded in this goal. But, without a clear understanding of how the process which led to the creation of this wall can be repeated, how it differs from mainstream construction, it is of little value. What is it about this process that makes it capable of producing something beyond the realm of conventional construction? The best way to understand this process is to see it in contrast to other systems.

To examine in detail how this new process, which holds life as its central aim, differs from standard processes, I compare it in depth to a construction system created by Frank Lloyd Wright, the Usonian Automatic block system. I have two reasons for choosing this case study. First, Wright is no slouch - a comparison with his work creates a higher standard for me to aspire to than if I had selected a typical



Frank Lloyd Wright's Usonian automatic block system.

concrete block system. Second, while the results of Wright's work often set themselves well outside the architectural mainstream in terms of form, the process he used to achieve those forms was structured quite like standard practices. By this I mean that he adhered to a process through which ideas evolved into drawings, and the drawings were given to a contractor to build.

Case Study: Frank Lloyd Wright's Usonian Automatic

In order to identify characteristics of a living architecture and the means for their production, I am investigating an existing construction system in terms of its ability to produce life. Ten ways in which this system falls short of creating life in the environment are identified, along with a description of how these shortcomings might be the result of process. Finally, I define a solution for each of these ten

problems. The solutions are presented as aspects of a new process, specific acts which replace each of the "Usonian" process features with ones aimed at producing life.

▫ 1. Step-by-step Process

PROBLEM, with Usonian Automatic: Tiles are not beautiful things in themselves.

CAUSE Related to Process: Tiles are built from a drawing on paper (fractured design /draw /build process).

SOLUTION Defined by New Process: Step-by-step process requires that each thing - each tile, each joint, each wall - produce deep feeling just as it is, before proceeding to next step.

▫ 2. Integrated Design And Construction

PROBLEM: Tiles neither have nor produce in the finished wall any real centers - they're dead.

CAUSE: Separation of design and construction means art of tile-making has no effect on tile design.

SOLUTION: Design and construction as a single, unified process allows form of tile and wall to be transformed during construction.

▫ 3. Design - Creating A Structure Of Centers

PROBLEM: Wall has no depth of surface.

CAUSE: Design as expression of an idea - the "folded plane" - a good idea, but still the real, built wall gets its being from a concept about what a wall "should be".

SOLUTION: In this process, the aim of design is to create a dense fabric of centers, letting the wall be a place in its own right and not just a plane separating inside and outside.

▫ 4. Construction - Preserving And Enhancing The Structure Of Centers

PROBLEM: Tiles and wall have no real sense of craftsmanship.

CAUSE: Skilled labor intentionally eliminated from construction process to save money, but no mechanism for empowering unskilled to make beautiful things employed.

SOLUTION: Process allows human spirit in craft to be part of construction.

▫ 5. On-site Adaptation

PROBLEM: Details of building (doors, windows, etc.) must conform to unit module.

CAUSE: Construction process is reduced to execution of drawings on paper.

SOLUTION: Tiles can be cut on-site in response to local geometry of doors, windows, details.

▫ 6. Full-scale Mock-ups

PROBLEM: Lack of hierarchy - top, bottom, corner, middle conditions in wall all same.

CAUSE: Design on paper not related to local conditions of block-in-use.

SOLUTION: Design mock-ups in paper, etc., on-site in-place during construction allow for design and fabrication of units specific to their location.

▫ 7. Testing Of Methods

PROBLEM: Vulnerability to weather. Some walls have had to be torn down and rebuilt after less than 50 years of service due to leaks and loss of structural integrity.

CAUSE: Design on paper led straight to implementation.

SOLUTION: An iterative process of design and testing is employed before construction.

▫ 8. Testing Of Materials

PROBLEM: Walls feel flimsy.

CAUSE: Wall materials are seen as means to end of carrying out wall-as-plane concept.

SOLUTION: Check each material component in terms of whether or not it helps to make a solid-feeling wall.

▫ 9. Color

PROBLEM: There is neither richness nor diversity of color in the Usonian wall.

CAUSE: No step in process for finishing materials due to desire for 'natural' materials.

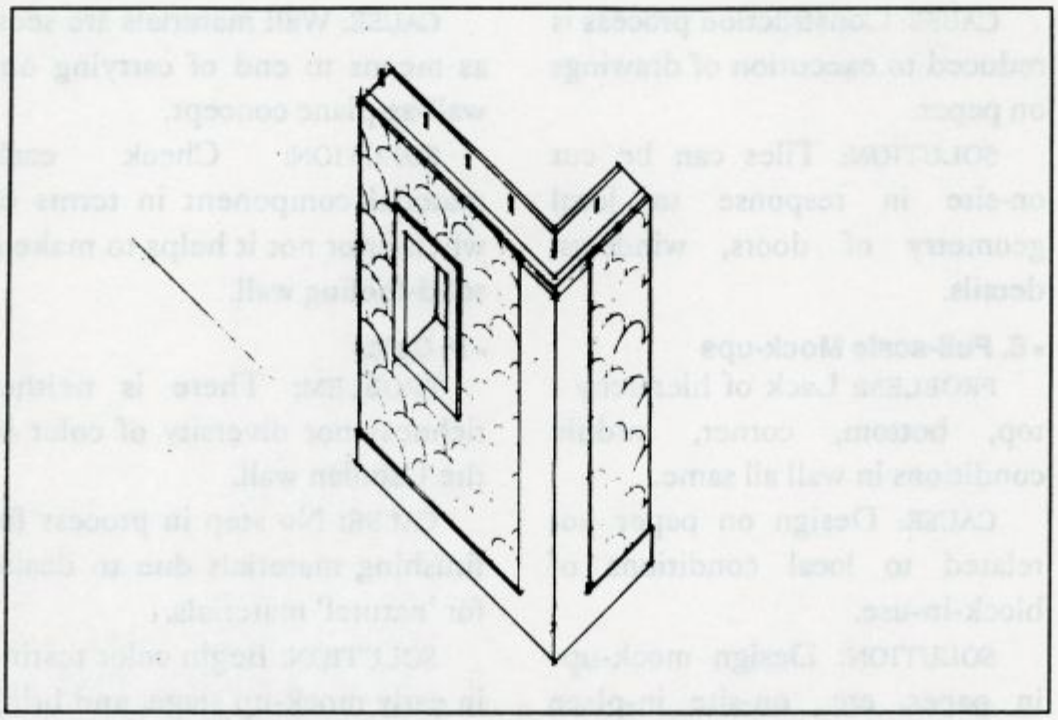
SOLUTION: Begin color testing in early mock-up stage, and bring color development along hand-in-hand with design and construction of whole.

▫ 10. Feeling

PROBLEM: The wall has no feeling. It has a cold, lifeless quality.

CAUSE: Individual steps in the process are not feeling-driven.

SOLUTION: Pause at each step, each design or construction decision, and consider the feeling it produces in you. Take the step that produces the deeper, more sincere feeling in you.



The Integral Concrete Tile Formwork Wall Experiment.

New Construction Methods Producing Life

Process Language: Ten Steps Toward Producing Life In The Built Environment

▪ 1. Step-by Step Process

Step-by-step process requires that each thing - each tile, each joint, each wall - produce deep feeling just as it is, before proceeding to next step.

Of course, this requires that we have a clear definition of what exactly the steps are. Otherwise, we could just go through the motions telling ourselves that we are resolving the feeling of each step before moving on to the next. In the ginkgo tile wall, I defined 4 major fields of centers.

- 1. The individual tiles
- 2. The spatial/structural connection between tiles
- 3. The relation of tiles to wall-as-a-whole
- 4. The wall-as-a-whole

According to the "solution" suggested here, I had to resolve the tiles and not move on to the wall-as-a-whole unless I was seriously content with the feeling that the tiles produced in me. This simple rule has enormous consequences if taken seriously.

Everyday construction is full of compromises in which people decide that one step is "good enough" in their haste to get on to the next step. This methodology has gone so far that the final stages of the construction process (painting, plastering, trim carpentry) seem aimed more at covering up poor materials and workmanship than at creating the last layer of integration between structure and space.

That we can never really cover up for a half-baked step in the process should be clear enough if we compare the process that generates a building to the genetic process that produces biological life. In the biological process, a misstep in a single phase of development has an inevitable and irreparable effect on the organism. We could say that quality is a process, not a product - that it can never be "added on" at the end of a process if it was not the result of every individual step in that process.

How do we know when a step in the process is complete? We can only know through feeling. Step 10 deals specifically with the role of feeling in the process of making. To generalize the 4 specific fields of centers in the tile wall and apply them to construction methods in general, we could say the following:

- 1. Make sure that the units you are working with are themselves good things.
- 2. Make the connections between them satisfying. The connections are perhaps more important than the units.
- 3. The units, the method of combining them, and the system-as-a-whole must support and enhance each other as fields of centers.
- 4. The system-as-a-whole must please you deeply as an entity.

Pay close attention to your feeling while you are making the thing, and do not go on to the next step in the process until you are satisfied in your feeling of the wholeness of the step you are on (both in terms of its process, the making, and the product).

▫ 2. Integrated Design And Construction

Design and construction as a single, unified process allows the form of the tile and the wall to be transformed during construction.

In this method, the entire process of building is integrated into a single integrated whole. The

current emphasis in architecture is on design and form; what happens in-between conception and completion of a project is often seen as a sort of nuisance that would somehow be avoided if such a thing were possible. The practice of making buildings by drawing up construction documents and turning them over to a contractor is likened by Christopher Alexander to making a painting by giving someone a canvas and a set of specifications on where the paint should go. Building, to be done well, requires a process which allows us to respond to the evolving structure, rather than tying us to a predetermined and inflexible model. Traditional home-building has long relied on this type of unified process, and the current trend toward design/build is an indication that its benefits are again being recognized by architects, contractors and owners.

A distinction should, however, be made between design/build as commonly practiced and the integrated design and construction process we are talking about. Design/build refers specifically to a contractual agreement in which a single entity contracts with the owner for both design and construction. Under the terms of such an agreement, the design may still be executed before and isolated from the construction work. The integration of design and construction, however, is an iterative process carried out on site during construction. It could take the following form in the design of a window once the walls of a home are framed up:

- 1. Initial Design Intensifies Larger Wholes - The size and shape of the window are determined so that they intensify the view, the light in the room, and the wall itself.
- 2. Testing Grounded in Feeling - The initial design is mocked up in place with cardboard or paper and its feeling - more specifically, the way it makes us feel in its presence - is evaluated.
- 3. Fine-Tuning Produces Deep Feeling - The initial design is adjusted and these adjustments are tested to find the form which creates a harmonious whole.
- 4. Crafting Preserves Deep Feeling - The window is framed in such a way that the deep feeling produced in the

mockup is captured in the actual construction.

We move on to the window frames, muntins and panes using this process to create smaller wholes which are in harmony with the window frame, the wall, and the building itself.

A small window.

3. Design - Creating A Structure Of Centers

In this process, the aim of design is to create a dense fabric of centers, letting the wall be a place in its own right and not just a plane separating inside and outside.

In The Natural House, Frank Lloyd Wright described the Usonian Automatic block system as an expression of the idea of the "folded plane". His idea was that by "folding" the shape of the wall in plan it could bear greater roof loads while also being thin in section. The blocks are then, in a sense, the means of expression of an architectural concept. This represents a fundamentally different starting point than the one proposed here. Here we start with the fact that every wall creates a field of centers, and our responsibility as architects is to intensify each center and the resonance between them. In step 1, I identified the four main centers as the tiles relate to the wall. Now we can move on to look at the field of centers created as we build a wall:

- 1. The base of the wall
- 2. The middle of the wall
- 3. The top of the wall
- 4. The corners where walls meet
- 5. Openings in the wall

It is no coincidence that in many indigenous cultures, laying the base, topping the wall, and making openings are all accompanied by prescribed rituals aimed at honoring the importance of these centers. I would say that much of the human comfort that we feel in indigenous architecture

comes precisely from the fact that the creation of centers is taken seriously. In the presence of a thing made this way, we can relax and be ourselves. A wall made this way is a place, not just a "plane". If we apply this understanding to the development of a construction system, we have a new definition of the design process:

- 1. Identify the existing structure of centers.
- 2. Make the individual units of the construction system harmonious with the larger whole.
- 3. Make them such that they can adapt to and flow with the character of different centers, rather than forcing different centers to become more alike.

4. Construction - Preserving And Enhancing The Structure Of Centers

This process allows for human spirit in craft by enabling the craftsperson to make a rich and complex field of centers from small, simple units.

The connection between the condition of our spirit in making a thing and our ability to make a "whole" of that thing is subtle but extremely serious. If the system that we are working with somehow prevents us from ever creating anything that is really one with us, that system may be requiring us to, in effect, turn a part of ourselves off as we work, and it will probably result in a product that requires others to turn a part of themselves off in its presence.

The number one determinant of job satisfaction is, according to psychologists, achievement, and I believe that a genuine feeling of achievement results from the making of "wholes", works which are harmonious both in themselves and with us. In construction, the making of wholes is dependent on the ability of the maker to preserve and enhance the emerging structure of centers. In the previous step, we saw how the atoms of the construction system must be beautiful in themselves if the system is going to be able to produce beautiful buildings. Here we focus on the relation of tiles to the wall-as-a-whole to see how the tiles give the builder the opportunity to intensify the emerging centers at every level of scale.

I believe this system falls somewhere between two extremes in its ability to support

the human spirit in craft. The best-case example is that of brickwork. Magnificent complexes of buildings have been built of brick. Huge urban spaces, (the Campo in Siena, for instance,) are formed by buildings made of bricks. While combining to make spaces of monumental scale, the individual bricks can be cut to produce levels of detail on the order of one inch. The units in this construction system can be adapted to produce smaller and smaller fields of centers which reinforce the larger ones.

The worst-case example might be the huge concrete panel systems employed in large office building construction. Here the craftsperson is not even permitted to work with his or her materials in any fulfilling way. Adjustments to the system are so cumbersome that they must usually be done in a prefabricator's shop prior to construction. The panels are frequently combined to make an undifferentiated vertical slab of the building's facade with detail, if there is any, in no way integral to the panel system, but added on later.

What characteristics must a construction system have in order to give the craftsperson the ability to preserve and enhance the emerging structure of centers in the course of construction?

- 1. The individual units are pleasing to work with.
- 2. They combine in a simple and straightforward way.
- 3. They can be easily modified - cut, shaped, combined - to produce finer levels of detail that support larger centers.

▫ 5. On-site Adaptation

Tiles can be cut on-site in response to local geometry of doors, windows, and details.

A tenth of an inch separates Heaven and Earth

- Zen proverb

One of the most serious problems with most modular construction systems is that they require that door and window openings fit the modular grid, rather than allowing them to go where they do the most for the feeling of the whole. This is true of the concrete panel system described in point 4, and it is even true of the Usonian Automatic.

Life can only come out of a system that responds to local geometries at a fine scale. In terms of the field of centers, the large centers will not be coherent if they

are not supported by fields of smaller centers. Systems which deny the builder the opportunity to create these reinforcing centers in effect limit the degree of life which their environment can support. A process which has this quality of fine-scale adaptability will need to include the following acts:

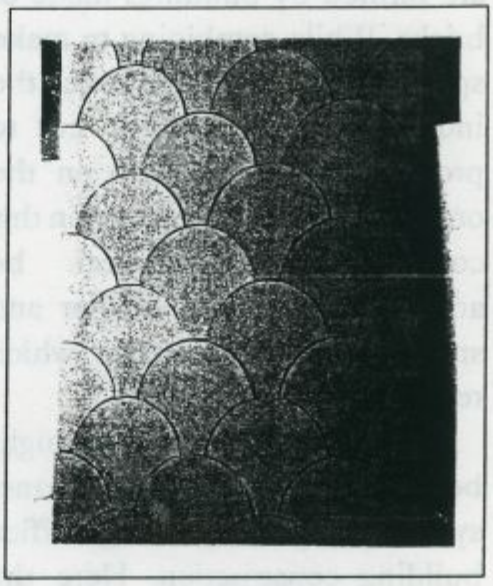
1. Do not let the modularity dominate the placement of windows and doors; ,make the system adaptable to these irregularities.

2. Make the individual units so that they can be easily modified - cut, shaped, combined - to produce finer levels of detail that support larger centers.

▫ 6. Full-scale Mock-ups

Mock-ups in paper, etc., on-site in-place during construction allow for design and fabrication of units specific to their location.

We really cannot evaluate the feeling that a thing will produce in us if it only exists in the architect's head. An idea, even in drawing form, does not exist in 3-dimensional space, so we cannot accurately gauge the effect that it will have on us as an entity. A full-scale mock-up, on the other hand, has real characteristics of structure and space, and how we feel in its presence is not a matter of interpretation or imagination - as it is in evaluating a drawing or scale model - it is simply a matter of knowing how we really feel.



A full scale cardboard mock-up of the wall.

A cardboard mock-up of a wall, for example, can accurately create the field of centers embodied in the real wall. When we change an aspect of the mock-up, we can feel the impact the change has on us directly. This direct experience enables us to do the most to intensify the centers as they exist in their specific local condition. Direct feeling, responding to the character of structure and space in their actual location, is the

essential advantage of working in mock-up versus working only at the drawing board.

1. Make design decisions on site, as much as possible.

2. Make full-scale mock-ups of important building elements.

3. Base design decisions on the direct feeling produced by your mock-ups (see step 10 on feeling as a guide in design).

▫ 7. Testing Of Methods

An iterative process of design and testing is employed before construction.

So much is lost in the translation when our process jumps from drawing-board design to implementation in the field. This is true in the making of individual building components as well as in the construction of entire buildings. By designing a process of making and not just a product, we immerse ourselves deeper in the reality of the thing we are proposing. Essentially, we need to know and to prove that the thing works in the world, and we cannot get away with offering only an image and leaving the methods of making to someone else.

The premise that product is entirely dependent on process is at the core of my argument. Testing of methods allows us to see how the process is impacting the quality of whatever we make, whether it is a single tile or a whole building.

- 1. Form is completely dependent on process, so pay attention to the process.
- 2. Get the process right and the form will follow.
- 3. Let the experience of making (testing) feed back to improve the design.

▫ 8. Testing Of Materials

Check each material component in terms of whether or not it helps to make a solid-feeling wall.

This step goes hand-in-hand with the previous one in defining a process grounded in actual making. We can speculate about how sturdy or flimsy a wall might feel by looking at a drawing of that wall, but only by being in the presence of the real thing can we know for sure. Of course, we cannot often produce the real thing, so we approximate with the use of mock-ups and materials tests.

The Ginkgo tile wall experiment described in this paper is itself a test of materials and methods. Its value lies in its ability to resolve numerous questions about materials and

methods (solidity, cost, feeling, adaptability) before the time pressures of actual construction kick in. Major Japanese construction firms spend 500 times what American construction firms spend on research, so we know it is possible to devote substantial resources to material and method testing within the construction industry.

- 1. Experiment with the actual materials of construction during the design phase.
- 2. Let the results of these experiments shape the design.

9. Color

Begin color testing in early mock-up stage, and bring color development along hand-in-hand with design and construction of the whole.

Color is too often left until the end of the process. This almost guarantees that the color will feel "added-on", rather than integral, because that is exactly what it is - added on. Wright's preoccupation with natural finishes was an understandable and admirable reaction to the overabundance of added-on color he saw in architecture, but a rigid commitment to only natural finishes limits the possibilities of feeling. Imagine the Golden Gate Bridge without its rust-red towers, or the Golden Pavilion in wood-tones. Unfortunately, it is a lot easier to get the color wrong than it is to get it right, so we frequently fall back on the natural color of materials out of temerity.

Color as add-on almost never produces life, and so we need to integrate color into our process from the outset. This may mean paying very close attention to our initial vision of the thing we are making. Like a dream, this vision may leave us with an overall feeling, even if imprecise in detail. And like in a dream, color may be one of the strongest elements producing that feeling in us. It is color, perhaps even more than form, that connects our spirit to the space and structure of the environment.

- 1. What is the quality of light and color in your vision of the project?
- 2. Strive to attain that most beautiful quality at every step in the process.
- 3. Experiment with color beginning very early in the process - do not leave it as something to be added on at the end.
-

▫ 10. Feeling

Pause at each step, each design or construction decision, and consider the feeling it produces in you. Take the step that produces the deeper, more sincere feeling in you.

The eye with which I see God is the eye with which God sees me.

-Teilhard de Chardin

The feeling of unity between self and universe is the personal experience of order. We experience order, not as an image or a concept, but as a feeling. Rainer Maria Rilke describes it best in The Notebooks of Malte Laurids Brigge: "...in later years Abelone tried to think with her heart, so that she could unobtrusively and directly come into relation with God. ... that ghostly alteration that we don't notice because its proofs seem so alien to us that we are constantly letting them slip through our fingers. In this single quote, Rilke captures feeling, "to think with her heart," and unity, "unobtrusively and directly come into relation with God." He even expresses the difficulty of recognizing feeling within the mechanistic world-view "because its proofs seem so alien to us."

That we do not presently have a world-view that easily accommodates feeling does not, however, mean that feeling stands in opposition to thinking. William S. Saunders of Harvard's Graduate School of Design describes the kind of feeling we are talking about in terms very much like Rilke's when he says that, "Feeling is knowing in the whole body. It is not the enemy of thinking. It is instead a special and valuable kind of thinking." Kant, too, wrestled with the question of what kind of thinking was taking place in the aesthetic experience, and found it necessary to make a distinction between conceptual thinking and feeling, saying, "judgments of taste...must have a subjective principle which determines what pleases or displeases only by feeling and not by concepts, but yet with universal validity."

How do we know whether or not our feeling is correct? Alexander acknowledges the problem of incorrect feeling when he says that, "According to my depth of perception, and the degree to which I am tuned to the reality of the thing, I glimpse, and feel, this unity directly." He has

shown how effective making comparisons can be if you ask the right questions. Thousands of experiments have been done in his courses at Berkeley, taking two objects and asking "which has more life?" An even more illuminating example is the "mirror of the self" experiment, in which we compare two objects and ask which one is more a mirror of our true self. I do not do these experiments justice by only mentioning them here, but the results have indicated a high level of agreement in terms of feeling.

It is through feeling that we experience unity, thereby coming into direct contact with order. Feeling is a part of both experiencing a building and producing one. It is the connection between the "objective nature of order" and the "subjective nature of order"; That is, when I see a bowl that is extremely whole, it makes me more whole. And in terms of making, Alexander points out that, "the process of drawing feeling from [ourselves] allows us to create order, and we cannot produce order in any other way."

The Ginkgo Tile Wall: Integral Concrete Tile Formwork: Process Diary

▫ Making The Tiles

The Integral Concrete Tile Formwork is based on the Block Panel System used by Hajo Neis on the Sakura Tsutsumi house and CES on the main gate at Eishin University. For this experiment, I have developed a system that uses the BPS blocks as formwork for a poured concrete wall.

The design for the ginkgo tiles comes out of several years of work by a number of people on the design of concrete tiles for the garden wall of the Sakura Tsutsumi house in Tokyo. I began working on the tile designs with Professor Neis in 1991. Since then, many students, Katharine Petersen in particular, have contributed to the work. Dozens of tile patterns have been developed along the way, and my starting point for work this semester was to select (and modify as necessary) a pattern for the tile to be used in the formwork experiment.

It is worth noting that the tile designs from years past were themselves developed in the kind of process I am proposing here. Initial notebook sketches were

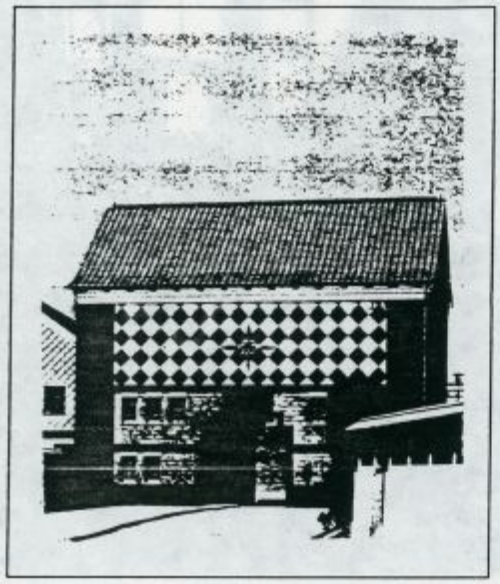
Setting the Tiles.

transferred to full-scale cardboard mock-ups of the garden wall built on the roof of Wurster Hall. In this way, we could see the patterns in a setting approximating their real application.

When I began work this fall, I brought together six of the mock-ups which I thought might work for the wall. Three students and I then evaluated them according to a slightly modified "mirror-of-the-self" experiment. We asked ourselves which patterns were not right for the wall, based on the feeling that they produced in us. At the end of this "weeding-out" process, we agreed that the ginkgo leaf pattern was the one we felt most deeply connected to.

Having selected a tile pattern, the next step was to get the size of the individual tiles right. The garden wall that the tiles were designed for was about six feet tall, and I had a hunch that the tiles would feel too small when applied to a building, as is intended in this experiment. Working with 3'x6' sheets of kraft paper, I began drawing fields of tiles in different sizes. Then I hung them on a large wall, and, after testing five

different sizes in this way, arrived at two "finalists".

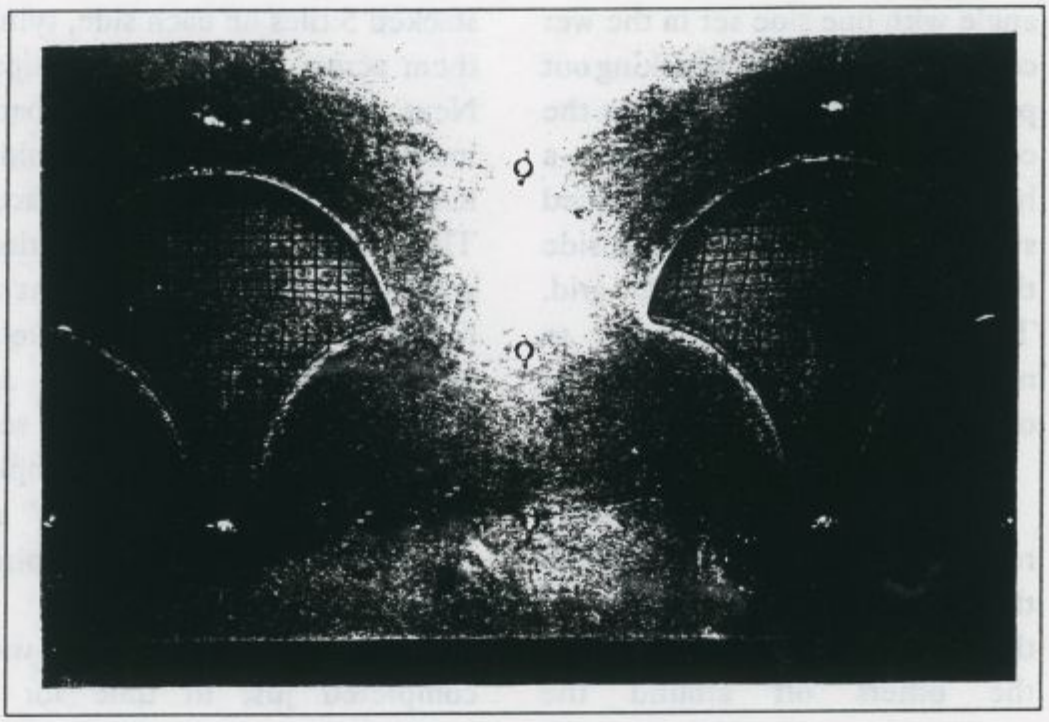


The block panel system: Eishin University.

I was finding it difficult to evaluate these in drawing form, so I cut individual tiles out of cardboard and laid them up in two 3'x6' areas. Because these mock-ups more closely approximated the actual feel of the tile wall (in terms of the relief and slight irregularities of surface) it was easy to choose one for testing in concrete. The main point in the work to this point was to use a broad range of full-scale mock-ups. This allowed me to compare alternatives side-by-side, which is extremely important. Often, design decisions are based on an analysis of only one option, or one option is replaced by another and the new one is compared to the memory of the old one (this happens frequently in drawing). In comparing several alternatives side-by-side, we are responding to a real, physical thing, rather than talking abstractly about ideas or possibilities. I believe this direct response is capable of producing better results than the hypothetical model.

I found that by cutting the tiles out of cardboard and arranging them in a pattern, I was beginning to get a "feel" for the tiles. I was, in effect, making the tiles and the wall, and it was this making process, more than any visual analysis of the finished cardboard walls themselves, that told me which of the two alternative tile sizes was right.

With the size and shape determined, I was ready to start working in concrete. I had a hunch that MDF (Medium Density Fiberboard) would make suitable formwork because of its density and resistance to moisture. Its sheet configuration was also



The Concrete Tile Forms.

important in that the tongue-and-groove profile of the tiles could be made by cutting the same shape out of 3 pieces of panel and then offsetting the panels by 3/8" when they were stacked

The depth of the tiles I determined by looking at one of the tiles from the Sakura Tsutsumi project. It was 1" thick, not quite thick enough to get the tongue-and-groove profile. By stacking 3 sheets of 3/8" MDF together, I could get a 1-1/8" tile. I bolted these together with eleven 3/8" x 2" carriage bolts. The square neck at the head of the bolt locks into a square mortise in the screw hole so that the screw does not spin when the wing nut is tightened down. Each edge of the MDF that would be in contact with wet concrete was rubbed with Johnson's paste wax.

I used a sand mix, also called a topping mix, for the first pour. This has a very fine aggregate and is available in ready-mix bags, which made it a good starting point for the mix experiments. After I filled the forms with the mix, I inserted the cross-ties. These are conventional 8" form-ties used with plywood forms bent in a 90°

angle with one side set in the wet concrete and the other sticking out perpendicular to the tile. Once the concrete had set up for about a half-hour, I scored the exposed surface (the back of the tile, inside the wall cavity) in a 1-1/2" grid. This score-line is intended to make the tile easier to break for openings and edges.

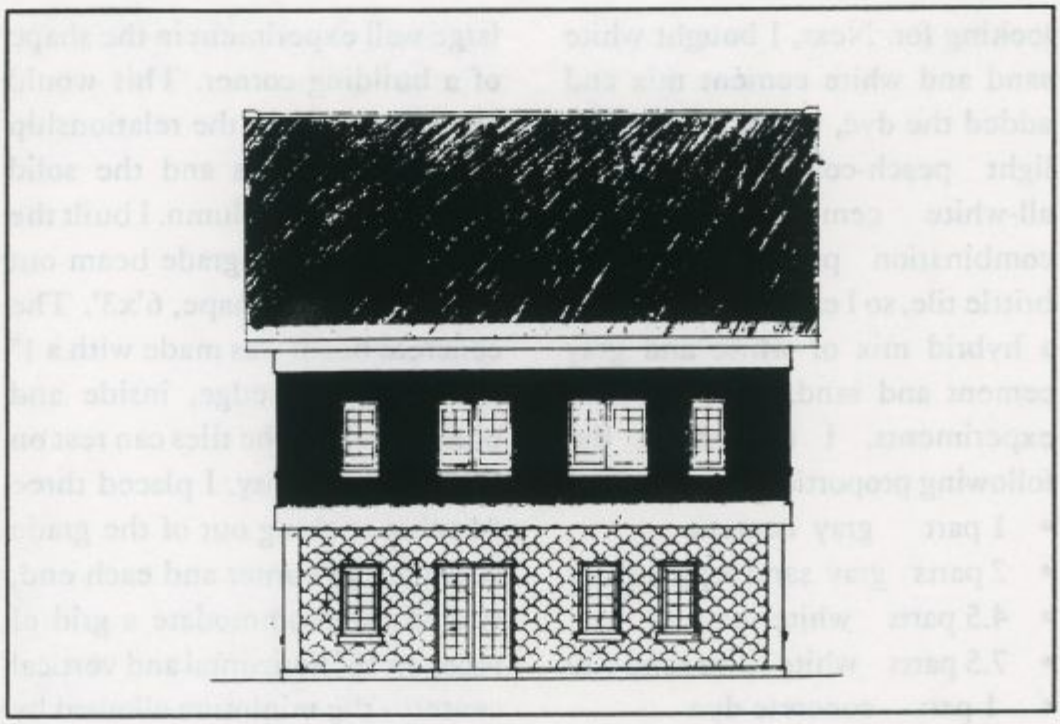
The tiles cured for 2 days and I removed the wing-nuts, bolts and the top layer of MDF. I had thought that I would be able to get the others off around the tongue-and-groove of the tile, but they would not come off. I then cut the next layer of MDF in half longitudinally so that the two halves could be pulled off without damaging the tiles. The third layer I cut into from the edge to the tile to relieve the pressure pinching the cured concrete in the forms. The edges of the tiles chipped as I removed them from the forms, so I added cement to the sand mix for the next pour. The strength of the tiles improved with a mix of 1:8 cement:concrete.

I made 10 tiles in this way and then built a plywood mock-up of a 2-foot section of grade beam. I stacked 5 tiles on each side, tying them across with the metal ties. Next, I placed 2 inches of foam insulation board against the inside face of the exterior wall surface. This model of a real wall section generated a remarkable amount of response from people, even from outside studio. This was an extremely valuable lesson, to see how strongly and deeply people will respond to "the real thing" as opposed to an oral or graphic description.

The small wall section was completed just in time for a studio-wide review. The tiles themselves, it was generally agreed, were pretty well resolved. Criticism of the wall focused on the relationship between the tiles and the building as a whole. The discussion included questions about the building corners, windows, and whether the tiles would be used for just one storey of a building or both (assuming a two-storey building). Based on this discussion, we arrived at the following assignments:

1) Draw a building elevation using the tile pattern

2) Do a thumbnail sketch of the economics of the system



Building elevation with Ginkgo tile wall.

In the elevation, my main concern was that the field created by the tiles would overwhelm the building facade. In drawing it, I realized that substantial frames around windows and doors and thick columns at the building's corners would be needed to maintain these areas as centers. Based on this elevation, I concluded that the wall would not appear too "busy" if the second storey were made of a different material (in this case, board and batten).

In looking at this drawing, I felt like it would help if the tiles were a different color from the corner columns and bond beams. Since the tiles are much easier and less expensive to color than the concrete infill, I began experimenting with coloring the tiles. I went to the local masonry yard and looked through their selection of concrete dyes. I made my selection by examining the actual dyes, rather than a color chart. I chose a brilliant golden yellow. The first experiments with this produced a sienna brown tile; not unpleasant, but not what I was

looking for. Next, I bought white sand and white cement mix and added the dye, which produced a light peach-colored tile. The all-white cement and sand combination produced a very brittle tile, so I experimented with a hybrid mix of white and gray cement and sand. After 10 color experiments, I arrived at the following proportions:

- 1 part gray cement
- 2 parts gray sand topping mix
- 4.5 parts white sand
- 7.5 parts white silica sand #30
- 1 part concrete dye
- 4 parts water

At this point, I did a cost analysis. The cost of materials came to 75¢ per tile, $1 per square foot of wall surface. This is based on retail prices. The labor cost of hand-making the tiles does not translate to industrial mass-production, which would use different methods resulting in different costs. However, assuming a labor cost of $8 per hour and the fact that it takes approximately 15 minutes to make 1 tile, the labor cost for hand-made tiles is roughly $2 per tile.

In response to the discussion at the review, I decided to make the large wall experiment in the shape of a building corner. This would allow me to show the relationship between the tiles and the solid concrete corner column. I built the formwork for the grade beam out of 2x12 in an L-shape, 6'x3'. The concrete beam was made with a 1" lip in the top edge, inside and outside, which the tiles can rest on for added stability. I placed three #4 rebar sticking out of the grade beam at the corner and each end, spaced to accommodate a grid of rebar on 16" horizontal and vertical centers - the minimum allowed by code. The concrete mix included 30% vermiculite by volume to make it easier to demolish the wall after the experiment.

The Concrete Tile Forms.

Once the grade beam was complete, I was ready to begin production of the tiles for the large wall experiment. I found a plastic mesh (1" grid) and stretched it between the layers of the MDF formwork panels. The mesh, then, lies 3/8" from the inside face of the tiles. The metal tie is passed through the mesh so that the mesh helps to spread some of the load on the tie across the breadth of the tile. Because the mesh is plastic, it can be easily cut after the tile is removed from the form.

Once the mesh was introduced, I felt the scoring on the back was no longer necessary. This was not based on an experiment, but I believed that the reinforcing would make it possible to break the tiles with a hammer, just as you would a brick.

Evaluation Of The Ten Steps

Did these steps work to produce life? Can they realistically be implemented in the world of construction? This evaluation looks at the 10 steps and weighs their successes and failures. "Local" strengths and weaknesses refer to the impact that the 10 steps had on the making of the Ginkgo Tile Wall. "Global" characteristics look to the implementation of these steps in contemporary construction.

▫ 1. Step-by-step Process

Step-by-step process requires that each thing - each tile, each joint, each wall - produce deep feeling just as it is, before proceeding to next step.

STRENGTHS: Local - I took great care throughout the process to adhere to this step. The extensive use of mock-ups and fine-tuning of the tiles in shape and color were aimed at producing deep feeling, and I felt confident that most steps were well resolved before the next one was taken. Global - While contemporary "mainstream" construction is not geared toward feeling, it is clearly a sequential process. Critical Path Method and network diagrams are common in construction management, so essentially the construction industry is already structured in such a way that makes it receptive to this step-by-step process.

WEAKNESSES: Local - I sometimes found it difficult to balance the commitment to resolving each step completely with time and technical considerations. For example, the

diamond-shaped tiles were determined to some extent by the Ginkgo tiles - they had to conform to the grid of ties established by the Ginkgo tiles. Their shape is, I think, not as pleasing as the shape of the Ginkgo tiles. Global - The construction industry is geared very much toward speed, and having the strength of convictions to say, "No, we can't go on to the next step until this one is resolved," is not easy given the massive pressures of time in today's system.

▪ 2. Integrated Design And Construction

Design and construction as a single, unified process allows form of tile and wall to be transformed during construction.

STRENGTHS: Local - The actual making of the tiles had a positive impact on the design of the tiles and wall. The method for connecting the base course to the grade beam, the lip on the grade beam to support the first course, the plastic reinforcing mesh - these were all developed in the midst of production, demonstrating how design and construction came together in one unified process. Global - Design/Build is rapidly establishing itself as an acceptable alternative to traditional methods of procurement in architecture. It is not yet developed to the point of a truly integrated design/construction process, but it is perhaps an indication that the community is beginning to realize the benefits of such a process.

WEAKNESSES: Local - Lack of time and even laziness sometimes prevented me from making changes which I knew, based on my experience in making the tiles, would improve their design. The reinforcing mesh, for instance, increased the thickness of the tongue and groove edges of the tiles just enough to require grinding in order for them to fit properly. I could have built new forms which would have solved this problem, but I didn't. Global - My unwillingness to change the forms is indicative of a resistance which construction workers are likely to feel on the job site. It is easier to just execute a design according to drawings and specifications than to really think about what is best for the situation. Changes also cost money. Furthermore, there is resistance to an integrated design/build process built into building practice today.

The standard American Institute of Architects Agreement, form B141, prohibits the architect from engaging in means and methods of construction, and this separation is very well established in the industry and will not disappear without a fight.

▫ 3. Design - Creating A Structure Of Centers

In this process, the aim of design is to create a dense fabric of centers, letting the wall be a place in its own right and not just a plane separating inside and outside.

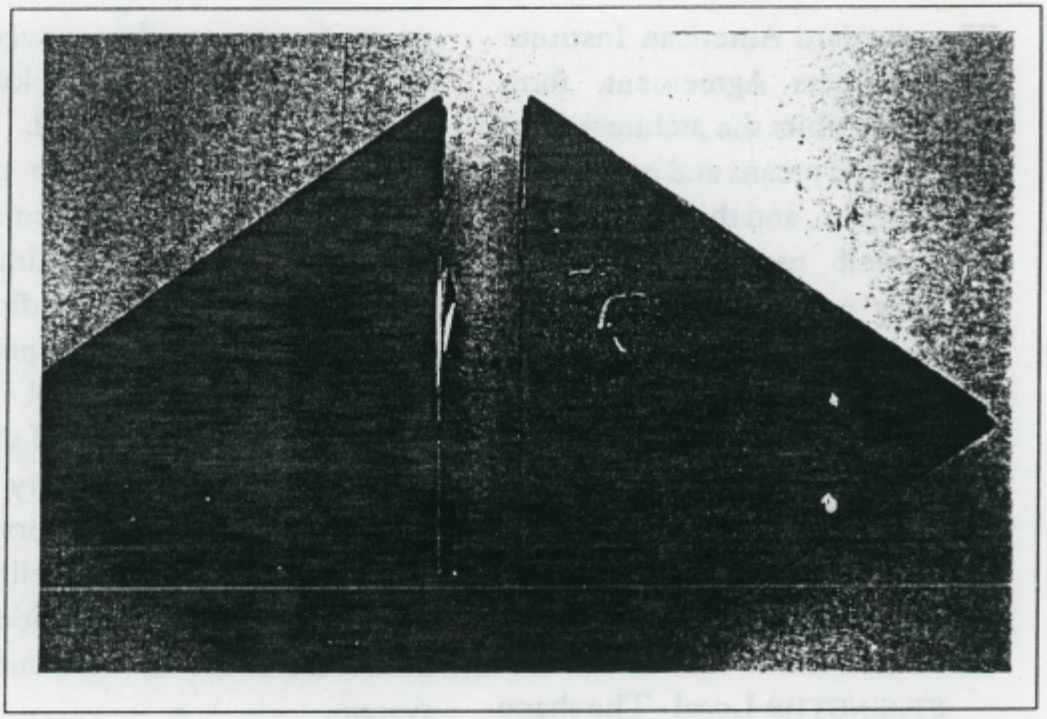
STRENGTHS: Local - The shape of the tiles was dictated very much by the need to create a strong field of centers, and provide people with a system that is capable of the kind of fine-tuning necessary to support major centers with smaller ones. The tiles can be cut to fit top, base, corners and openings in the larger field of the wall. Global - This flexibility makes this system more appealing to the construction industry. Like brickwork, it provides the builder with a single unit which can be adapted to most building situations.

WEAKNESSES: Local - While the process described here is intended to produce a living architecture, there is a slight feeling of rigidity or resistance to the easygoing quality of, for example, brickwork in the Ginkgo Tile Wall. The repetitive character of the units could also be slightly deadening if applied to a large, continuous surface. Global - The rigidity of the system could prevent people from using it. If it proved itself unadaptable to the level of detail and flexibility necessary to reinforce the field of centers and produce a relaxed, alive feeling to the wall, I would consider it unsuccessful as a construction system.

▫ 4. Construction - Preserving And Enhancing The Structure Of Centers

Process allows human spirit in craft to be part of construction.

STRENGTHS: Local - The best measure of this condition is that I thoroughly enjoyed the process of making the tiles and wall. Others even joined in the construction spontaneously to share in this feeling. I have often thought that an enjoyable process resulted in a better product, but here I learned that the reverse is also true - that the process of making is more satisfying when it results in something whole. Global - A construction system is more likely



The tiles cut to fit window opening.

to catch on if it produces not only a beautiful result, but also a real sense of satisfaction, of achievement, in those who use it. I think the integral concrete tile formwork system has a strong advantage over many other wall-building methods in this respect.

WEAKNESSES: Local - To produce enough tiles to make an entire building using the hand-made method I employed to make this wall experiment would probably become a kind of drudgery after a while, due to the repetitive quality of the tile-making process. It is assumed that some means of industrial production would be used to produce the tiles in large volumes, just as conventional CMU's are now produced. Global - Without industrial production, it is unlikely that mainstream builders would use this system. There is a strong inclination to go with the tried-and-true versus the experimental, and the economies of mass production would be on the side of standard poured in place or CMU wall systems.

▫ 5. On-site Adaptation

Tiles can be cut on-site in response to local geometry of doors, windows, details.

STRENGTHS: Local - The tiles are adaptable to these local conditions to a high degree. They can be cut with a masonry hammer or a circular saw with a masonry blade. Global - This is an essential feature if the system is to be successfully implemented in the industry. The adaptability of the tiles means that no additional components (special tiles for corners or openings, for example) are necessary in using the system. It also means that the units are responsive to the placement of openings, rather than forcing the layout of doors and windows to conform to the grid of the tile pattern.

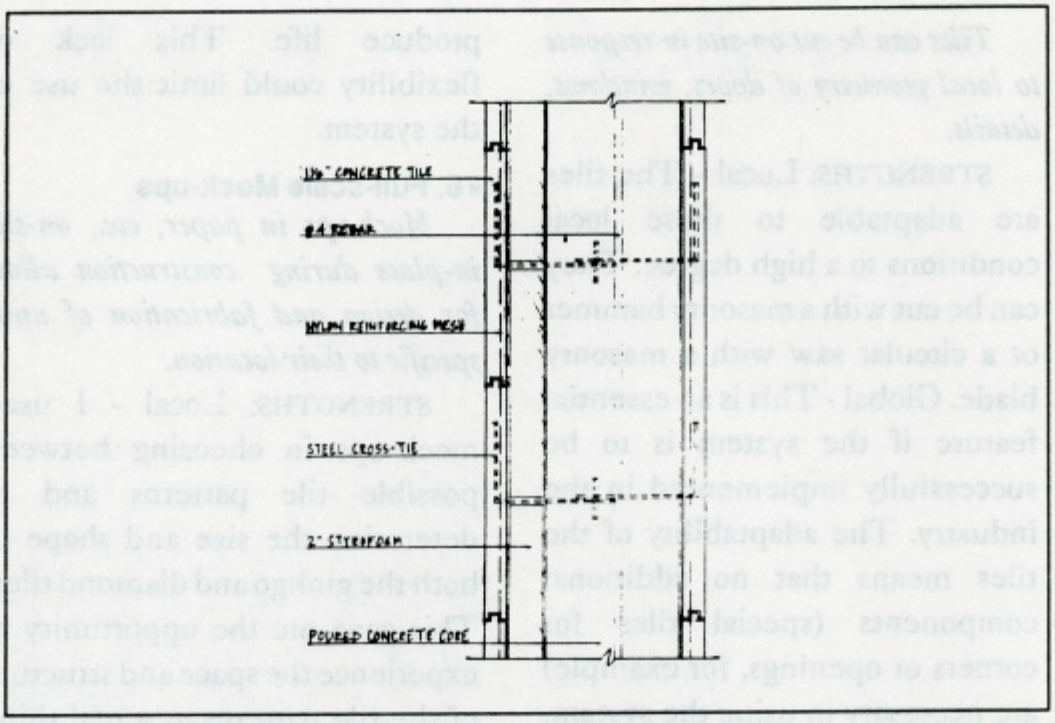
WEAKNESSES: Local - The system is not as responsive as, for example, brickwork to small changes. A change in tile pattern, for example, requires a concrete band as a transitional zone between the two patterns. It also does not offer the "sculptability" of styrofoam formwork. Global - At a level of complexity beyond that of this wall experiment, the tile system could possibly fail to provide the flexibility necessary to produce life. This lack of flexibility could limit the use of the system.

▫ 6. Full-scale Mock-ups

Mock-ups in paper, etc., on-site in-place during construction allow for design and fabrication of units specific to their location.

STRENGTHS: Local - I used mock-ups in choosing between possible tile patterns and to determine the size and shape of both the ginkgo and diamond tiles. This gave me the opportunity to experience the space and structure of the tile patterns as a real thing producing real feeling. Global - Small mock-ups are frequently done informally on site, and occasionally (in Japan, for example) are an important and integral part of the design/construction process. Mock-ups on site tell us much more than a design on paper can, and a familiarity with even the occasional use of small ones opens the window for more extensive and meaningful use of mock-ups in design and construction.

WEAKNESSES: Local - I did not do a mock-up of the wall as a whole. I believe this would have helped resolve some questions about the relation of individual



Integral concrete tile formwork wall - section.

units to wall-as-a-whole. Also, the tile pattern should be a response to the local condition of the wall, and this is best determined by mock-ups. In the case of the Ginkgo Tile Wall, I began with the tile pattern and this generated a wall design. Global - Mock-ups take time. Time costs money. More importantly, the entire system of conventional design and construction is structured to separate design and building. Mock-ups cannot be employed within a system which contractually and organizationally prohibits their use.

▪ 7. Testing Of Methods

An iterative process of design and testing is employed before construction.

STRENGTHS: Local - Testing of methods was fundamentally what this experiment was all about. I had the freedom and flexibility to propose and test a process and to let the experiment, the actual construction, shape the design of the process. This paper is, itself, an indication of how my work on this project has been aimed at creating a process, more than just a product. Global - As a construction system, the integral concrete tile formwork is infinitely more real, even more

"marketable", than if I had simply proposed a system on paper, because I have built and tested it. By proposing a method, and not only a product, the work becomes applicable to any act of making, not simply the building of concrete walls.

WEAKNESSES: Local - The process, in the form of the 10 steps, was proposed at the beginning of the actual work. The experience of making the wall did not get to influence the definition of the process as much as I would have liked. This paper is a step toward fine-tuning the process based on the experiment, and a valuable advance would be a modified process which takes into account at a higher level the strengths and weaknesses of the actual experiment. Global - The construction industry and its clients are not currently willing to put many resources toward research, and there is no real opportunity for experimentation or innovation within the context of individual projects. This makes it difficult to test methods or materials outside the university.

▫ 8. Testing Of Materials

Check each material component in terms of whether or not it helps to make a solid-feeling wall.

STRENGTHS: Local - I spent a great deal of time getting the concrete mix right. The process of making the tiles informed me that the scoring on the back, for example, was not contributing to the strength or adaptability of the tiles, so I dropped it. The small wall section model, in particular, gave my colleagues a chance to offer valuable suggestions about the system. Global - There is some precedent for materials testing in the construction industry - concrete undergoes slump tests before pouring, certain components are occasionally replaced with others if they do not work out in the early phases of construction - but for the most part, testing is controlled by agencies or laboratories and does not occur on site.

WEAKNESSES: Local - The wall materials are still not perfect. Some of the tiles are brittle, indicating that a better concrete mix could be found with further experimentation, and the resistance of the cross-ties to hydrostatic pressure during the

core pour needs to be explored. Global - Standard processes of design and construction are just not set up to encourage or even tolerate materials testing. Both clients and constructors would rather use something out of a catalog than develop a new material, because it takes time and costs money to come up with something new.

▫ 9. Color

Begin color testing in early mock-up stage, and bring color development along hand-in-hand with design and construction of whole.

STRENGTHS: Local - Rather than take the color of plain concrete as a given, I made several experiments with concrete dyes to get the color right. The color of the interior tiles and exterior tiles are different, and they differ from the color of the trim, columns and beams. Global - Because the tiles are relatively thin, they can be dyed without too great an additional cost. This gives the builder the opportunity to add color to a building which would otherwise be concrete-gray.

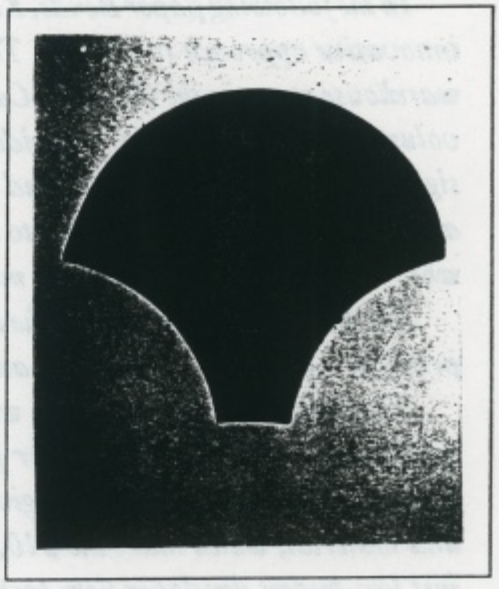
WEAKNESSES: Local - There is, of course, always room for more experimentation with color. I used a commercial dye rather than exploring custom-made dyes, and I have a slight feeling that the colors could be even better with further testing. Global - While color does not add much at all in terms of cost, it is still more expensive than no color, and this might encourage builders to go without color in using the wall system. Also, bad color can be worse than no color, and the potential for abuse is always present.

▫ 10. Feeling

Pause at each step, each design or construction decision, and consider the feeling it produces in you. Take the step that produces the deeper, more sincere feeling in you.

STRENGTHS: Local - Particularly at the beginning, determining the tile pattern, I was very thorough in reigning in my desire to charge ahead to the next step until the feeling produced by the current step was right. Global - Once we clearly define what we mean by feeling, there is surprising agreement about its presence and degree. Feeling gives us a gauge of the spirit of life in our buildings and, in the end, helps us to make a better built environment.

WEAKNESSES: Local - As I became more committed to both the form of the wall and the process of its construction, I noticed I became less determined to get the feeling of each step just right. For instance, the feeling which the diamond tiles produces in me is not as profound as that made by the Ginkgo tiles, but I went on with construction rather than bring the whole thing to a halt while I searched for a better shape. Global - It is extremely difficult to reach consensus about what we mean by real feeling. One person thinks it is feelings (emotions), another thinks of images, ideas, and so we fail to reach agreement about the feeling a building or building element produces in us because we are working with different definitions of feeling. One of the greatest problems with architecture and construction today is that feeling is not allowed in, and its absence is not something that can be easily or quickly corrected.



The Ginkgo Tile.

Oakland Cannery Lofts
The Living Alternative

Katalin Bendɛ, Meea Kang, Saul Pichardo

In the following paper Bende, Kang and Pichardo describe a simple and highly innovative approach to housing. The housing is to be built within cheap, neutral warehouse space in the Oakland Cannery. Each apartment is to be included in a volume that is 60 feet long, 20' wide, 16' high. Within this space, tenants who will sign a five year lease, lay out and design the contents of the space — their own apartment — entirely according to their own wishes. They are helped to visualize what they are doing, with a scale model that they themselves make.

The freshness and variety of the apartment plans is extremely stimulating; and provides a high degree of variety and individuality to the apartments.

The authors go on to describe way they have developed that this will be done, within a fixed budget (the interior part of each apartment is done for $10,000). And the construction details are given eleven distinctive innovations of technique and material, which make the $10,000 create a place that is really home — not just low-budget developer ticky tack.

The evidence the authors provide shows that this kind of housing produces apartments that have a much greater belonging relation between tenants and environment than is usual; and that this is done with a remarkably low budget.

The fact that owners are prepared to sign a five-year lease after doing this work, demonstrates the high level of user satisfaction.

I believe that an industrialized version of this process, starting with conbstruction of insulted warehouses, and then using the user-controlled infill process which is described here, may well be able to provide people with excellent housing for a cost perhaps as low as $25,000 per dwelling.

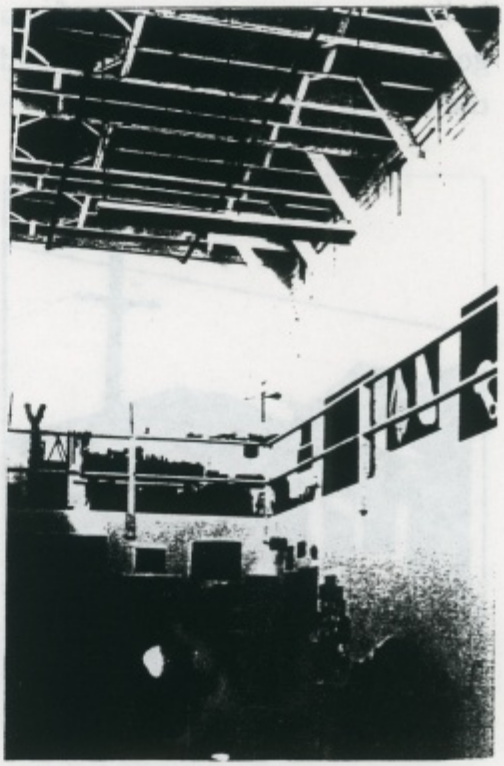
I believe that this process, which genuinely takes the design out of the hands of the architect, and places it firmly in the hands of the users, can show the way to a new level of belonging in the environment, even for very low cost housing.

HOME AT LOST

Home is the place of the soul. It is the source of our belonging, nurturing our personal connection to the world. In its very unique individuality, we find comfort and certainty. Strikingly, much of today's housing has lost this natural essence of belonging. Design practices have alienated people from their environment creating a situation that is damaging to the relation between people and their home. To further understand the nature of this problem, we will describe a simple approach to housing, one which can create the living quality of belonging that is lost in today's architecture.

BACKGROUND

The conversion of warehouse space is a viable alternative for housing throughout the Bay Area. Abandoned buildings are being cleaned out and rehabilitated in every industrialized city, providing urban reuse where it is needed most. Factories that once housed flourishing industry today accommodate offices, retail shops, restaurants, galleries and private housing. There are over 1500 recorded loft conversions here in the East Bay and over 2000 converted spaces registered with the City of San Francisco.1 The most successful conversions have been built by individuals, or collaborations of artists. Communities of people have built their own environment in an effort to create a more secure and flexible live-work place. These low cost, unrestricted communities have a real sense of home, of personal space - and most of all it is living architecture.



Living Architecture: Franklin Street Lofts.

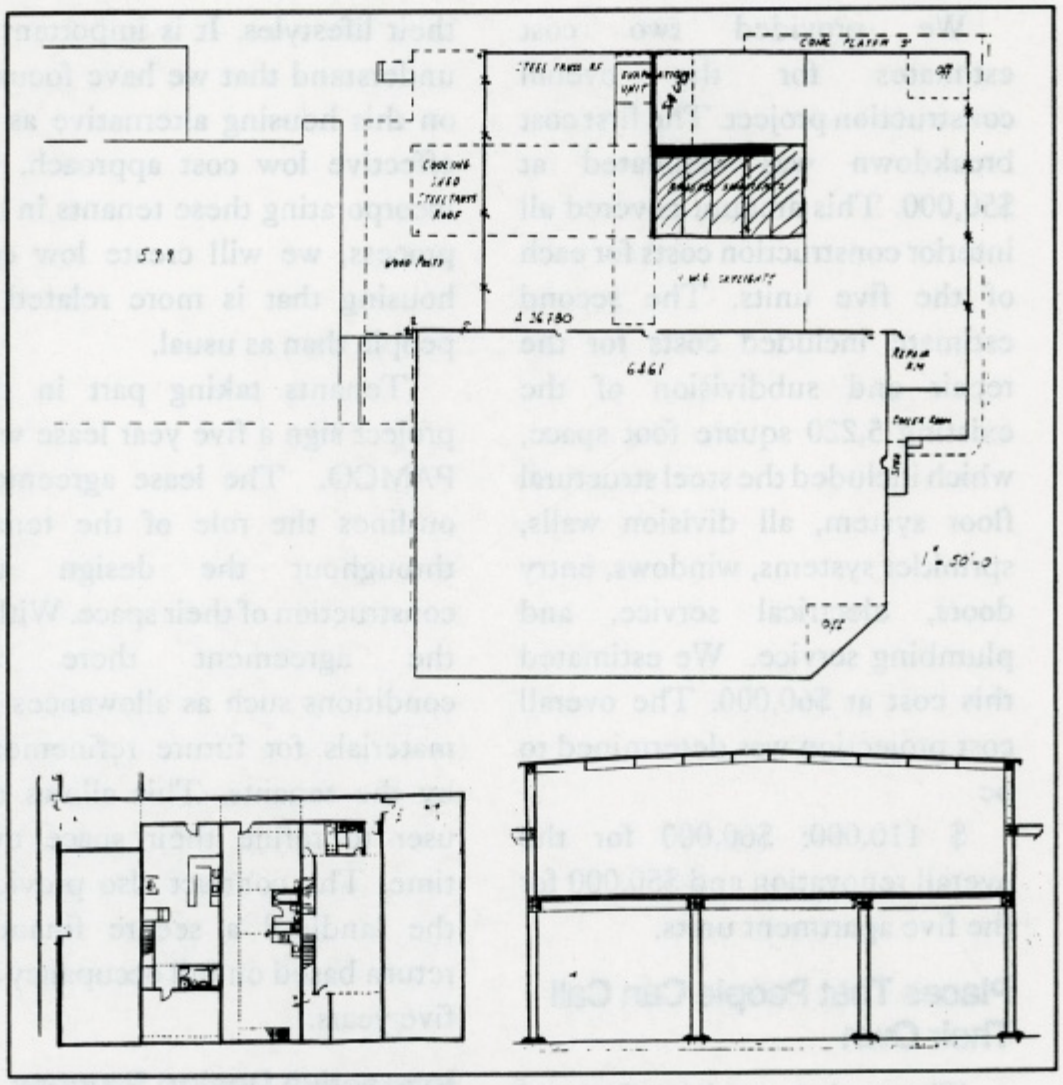
With the growing demand for live/work housing developers and private owners have renovated buildings, but failed to create living spaces that people have an affinity for. Too often these projects have been motivated by profit, so that no veritable thoughtfulness in making the space has ever been given. Instead, what is produced is low budget, unrefined, impersonal spaces that have no connection to people. This highly insensitive housing does not create the living quality of belonging that we believe to be so necessary for a good relation between people and their environment.

Insensitive housing: impersonal and unrefined.

Oakland Cannery Building.

Oakland Cannery Lofts

The focus of the project is to create five live/work apartments, where users are encouraged to create their own home environment. We are working on a 5,220 square foot section of a commercial warehouse located at the Oakland Cannery in South East Oakland. The building was built in 1923 and later converted into a 300,000 square foot business complex comprised of commercial outlets and fifteen live work lofts. Pacific American Management Company (PAMCO) owns and manages the complex, and will be funding the renovation.



Oakland Cannery : Site plan and section.

The units we are developing are contained within a volume that is 18 feet wide and 52 to 58 feet long, with a ceiling height of 16 feet. The actual footprint of each unit is 963 sf allowing an additional 300-500 sf of loft space above. The units have two walls 8' x 18' of windows on the East and West perimeter, providing adequate lighting throughout the day. Presently, the vacant space is contained within a volume that is 35 feet high. A steel structural floor system will be erected 16 feet above ground level to support the five apartments.

We provided two cost estimates for the overall construction project. The first cost breakdown was estimated at $50,000. This amount covered all interior construction costs for each of the five units. The second estimate included costs for the repair and subdivision of the existing 5,220 square foot space, which included the steel structural floor system, all division walls, sprinkler systems, windows, entry doors, electrical service, and plumbing service. We estimated this cost at $60,000. The overall cost projection was determined to be

$ 110,000: $60,000 for the overall renovation and $50,000 for the five apartment units.

Places That People Can Call Their Own

The project we have focused on deals with this sensitive issue of creating living home environments; places that people can call their own. We selected four future tenants: Moon and Maurice are painters, Raven is a photographer, Liliana is a writer. They were chosen because they all had the desire to design spaces that would better accommodate their lifestyles. It is important to understand that we have focused on this housing alternative as an effective low cost approach. By incorporating these tenants in our process, we will create low cost housing that is more related to people than as usual.

Tenants taking part in this project sign a five year lease with PAMCO. The lease agreement outlines the role of the tenant throughout the design and construction of their space. Within the agreement there are conditions such as allowances for materials for future refinements by the tenants. This allows the user to refine their space over time. The contract also provides the landlord a secure financial return based on full occupancy for five years.

Interactive Design Process

The essence of our approach places the design process into the hands of the user. We are relying on tenant participation, a method where tenants design their space from layout to finish details with our help. This approach allows the spaces to evolve naturally from personal needs and activities

inspiring a real sense of belonging.

Living Patterns

In order to gain a clear understanding and direction for design, the tenants were asked to write a brief description of their daily routines at home. We directed our attention to these patterns of everyday life; habits, routines and rituals of people in their space. This exercise helped the users focus on the essential activities of their life in connection with their home environment. At the same time the essay enabled us to understand their living patterns and proved to be helpful in identifying primary activity spaces.

Moon and Maurice, for example indicated that large painting studios were the most important spaces for their home. Liliana's focus was on the traditional family setting. She had a strong desire for large communal areas to accommodate family gatherings. Raven needed large flexible space and a dark room for her work.

Preliminary Layouts

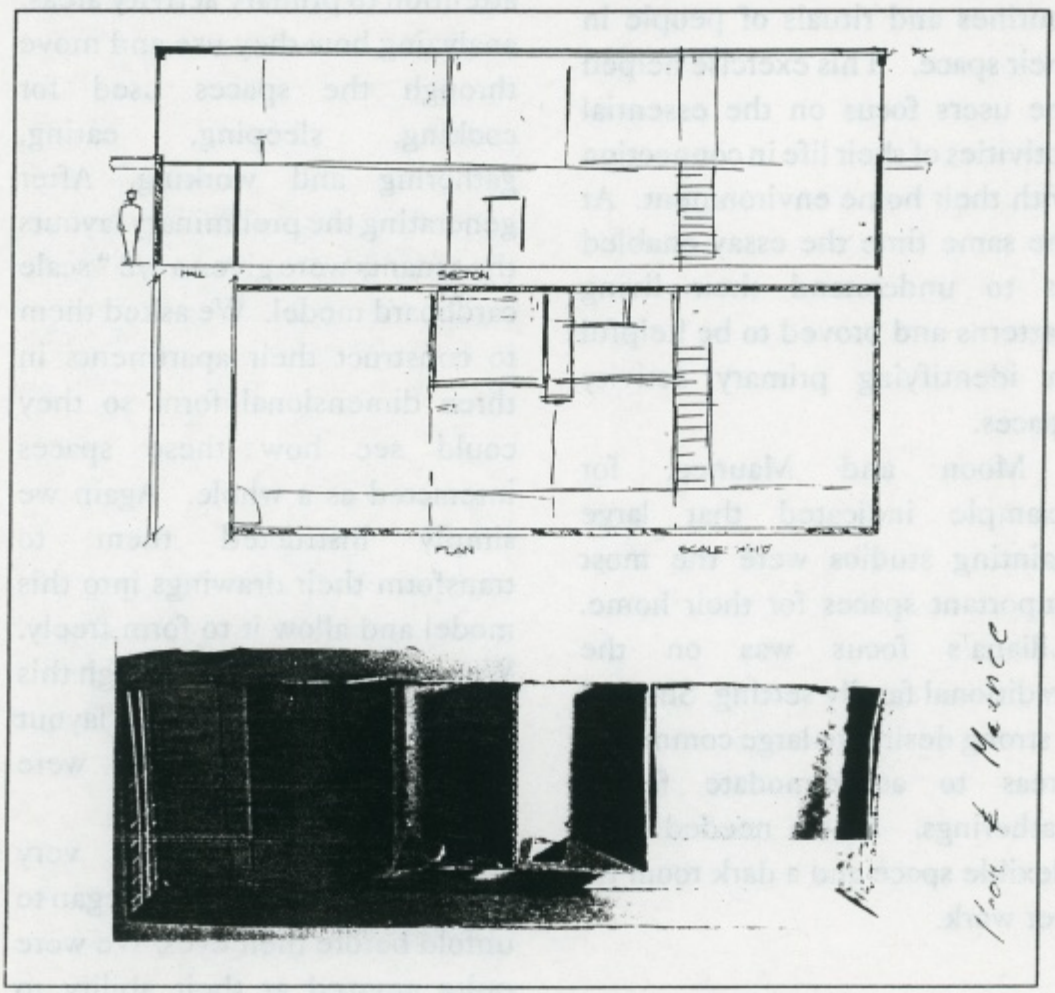
Each tenant was given a 1/4 inch floor plan (52 ft x 18 ft) and a section to layout their apartments. The only direction we gave was encouragement to go beyond their images of ideal spaces and think deeply about how they will live and work within this place. We asked them to pay particular attention to primary activity areas, analyzing how they use and move through the spaces used for cooking, sleeping, eating, gathering and working. After generating the preliminary layouts the tenants were given a 1/2 " scale cardboard model. We asked them to construct their apartments in three dimensional form so they could see how these spaces interacted as a whole. Again we simply instructed them to transform their drawings into this model and allow it to form freely. We assured them that through this process any changes in the layout from paper to model were acceptable and encouraged.

The tenants were very enthusiastic as their ideas began to unfold before their eyes. We were quite amazed at their ability to create spaces that accurately

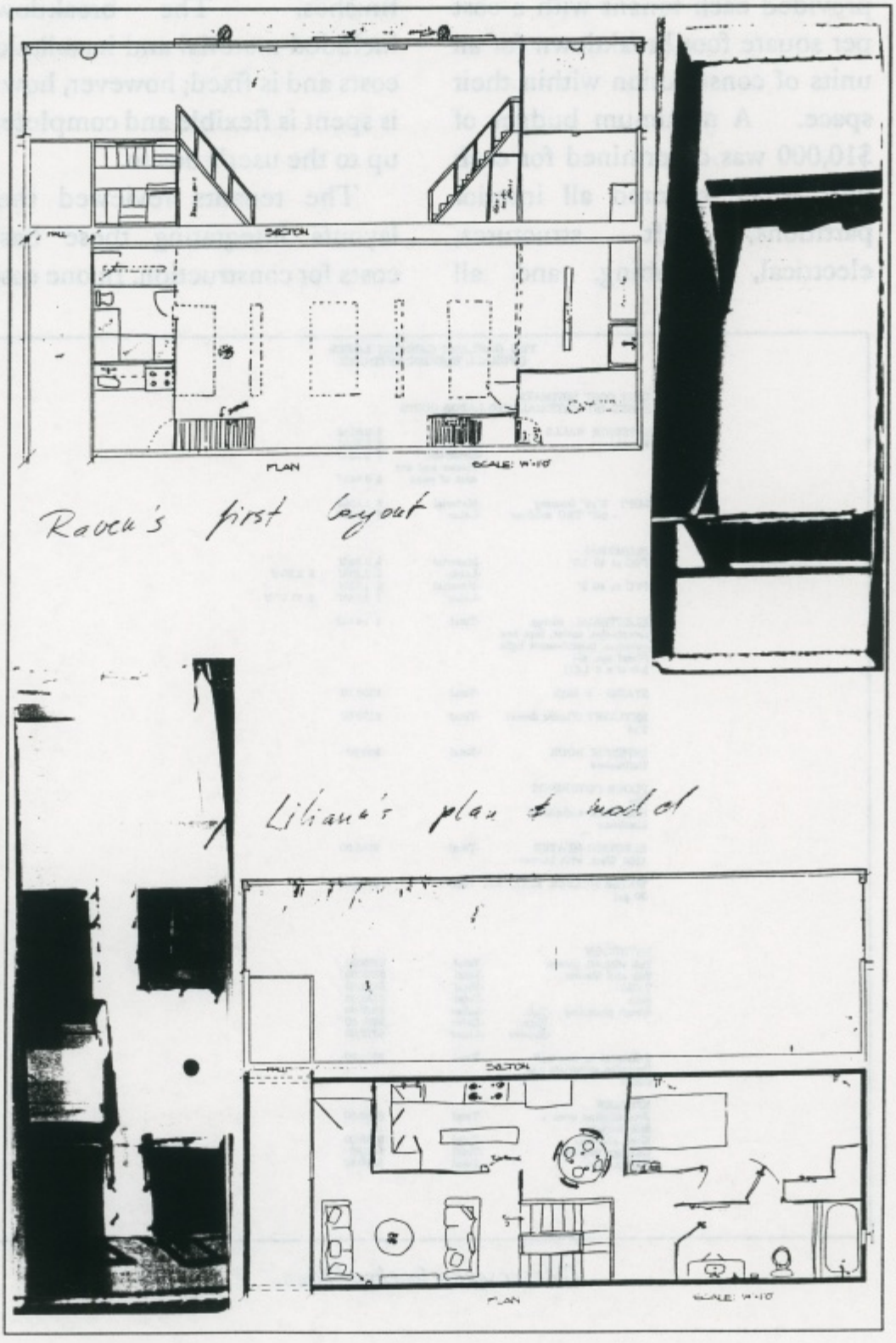
reflected their lifestyle. From these layouts activity centers were clearly defined enabling us to help them further refine their designs. Although they wanted our opinion, we did not inject any suggestions because we realized the possible consequence of our input. At this early stage, it was important to allow the users to develope their spaces from their own visions and understandings. Truly, these spaces had to evolve naturally from the user's personal relation to the space, a connection which supports the living quality of belonging.

Reality: Cost Introduction

The next phase involved hard costs for construction. We



Preliminary tenant layouts. First floor plan, section and model. Layouts reflect the tenants ideal visions..


SECTION
PLAN
SCALE: 1/4"=1'-0"
Rocco's first layout
Liliana's plan & model
SECTION
PLAN
SCALE: 1/4"=1'-0"

provided each tenant with a cost per square foot breakdown for all units of construction within their space. A maximum budget of $10,000 was determined for each unit which covered all interior partitions, loft structures, electrical, plumbing, and all finishes. The breakdown included material and installation costs and is fixed; however, how it is spent is flexible and completely up to the user's desire.

The tenants reviewed their layouts integrating these basic costs for construction. In one case,

THE OAKLAND CANNERY LOFTS
OVERALL BUDGET ESTIMATE

UNIT COST ESTIMATE
BASED ON MATERIAL AND LABOR COSTS

INTERIOR WALLS 24" o.c.	-Framing	$ 0.95/sf	
	-Insulation	$ 0.35/sf	
	-Sheetrock	$ 1.00/sf	
	-Primer and one coat of paint	$ 0.64/sf	
LOFT - 2"x8" framing - 5/8" T&G subfloor	-Material	$ 1.40/sf	
	-Labor	$ 1.50/sf	
PLUMBING			
PVC sc 40 1/2"	-Material	$ 0.26/lf	
	-Labor	$ 2.33/lf	$ 2.59/lf
PVC sc 40 3"	-Material	$ 2.33/lf	
	-Labor	$ 9.64/lf	$ 11.97/lf
ELECTRICAL: wiring, receptacles, meter, fuse box switches, incandescent light (Total apt. sf+ loft sf x $ 1.47)	-Total	$ 1.47/sf	
STAIRS - 8' High	-Total	$300.00	
SKYLIGHT (Plastic dome) 2'x4'	-Total	$170.00	
INTERIOR DOOR Unfinished	-Total	$60.00	
FLOOR COVERINGS			
Tile			
Pine Plank unfinished			
Linoleum			
ELECTRIC HEATER 1500 Watt, with blower	-Total	$145.00	
WATER HEATER, ELECTRIC 30 gal	-Total	$389.50	
BATHROOM			
Tub without shower	-Total	$293.00	
Tub and Shower	-Total	$328.00	
Toilet	-Total	$132.00	
Sink	-Total	$134.00	
Rough plumbing -Tub	-Labor	$220.00	
-Sink	-Labor	$200.00	
-Shower	-Labor	$212.00	
3 fixtures on one wall (Includes materials and labor)	-Total	$800.00	
KITCHEN			
Freestanding oven + four burners	-Total	$280.50	
Hood and Fan	-Total	$110.00	
Garbage disposal	-Total	$83.50	
Refrigerator	-Total	$350.50	

Cost per square foot breakdown.

the costs superceded the $10,000 budget, the other two fell just below $10,000 unfinished. In order to adequately complete each unit, all tenants needed to reevaluate their layouts to make room for the cost of finish details. Liliana's cost estimate amounted to $14,000 unfinished, which meant she needed to make some serious changes to her plan to meet the budget. Together we reviewed the model and examined possible changes that would not damage the essence of her initial intent. Raven's initial costs amounted to $9000 which meant that small changes had to be made to allow for finish detailing. Moon and Maurice's studio was estimated at $8700 which meant that they too needed to make small changes to give them the freedom to select final details.

This process helped prioritize spending, and enabled the user to specifically define all elements of their layout. This unique aspect of our process gave the tenant control of how the budget will be used to create their living environment.

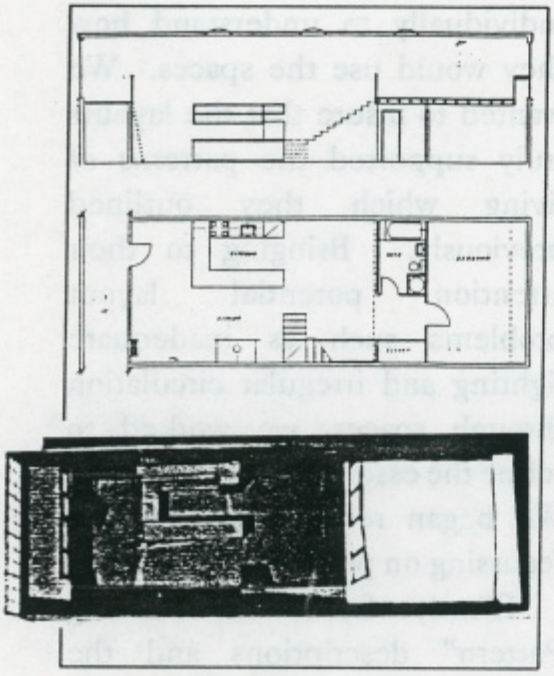
Centers: Spaces With The Living Quality

Once the tenants refined their layouts integrating the hard cost breakdown we met with them individually to understand how they would use the spaces. We wanted to insure that the layouts truly supported the patterns of living which they outlined previously. Bringing to their attention potential layout problems such as inadequate lighting and irregular circulation through spaces, we worked to refine the essence of their designs. We began refining the designs focussing on primary centers.

Clearly from the "Living Pattern" descriptions and the "Preliminary Layouts", each apartment had particular centers, spaces with special feeling, and quality.

Liliana spends a lot of time with her family and friends which explains her need for a large living space where she can comfortable accommodate family gatherings or listening to music with friends. On the West end of her loft space is the bedroom, a promising beautiful room. She created a waist high bench along the

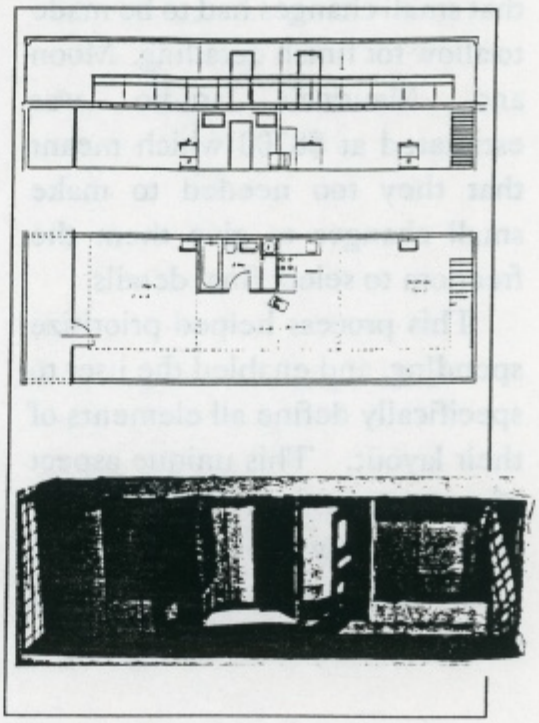
window, so the room below would get natural light as well. Along the bench she can sit, display plants or books.



Liliana's revised layout. Changes reflect smaller loft space, new positions of bathroom and closet space.

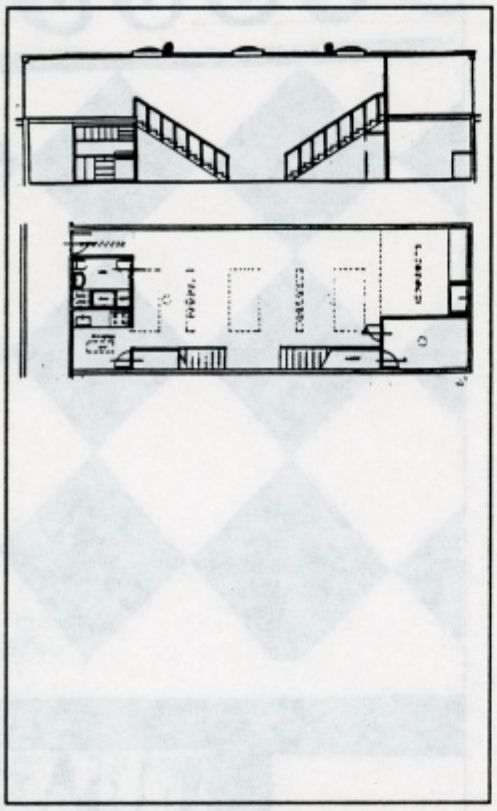
Maurice and Moon designed two distinctive painting studios taking full advantage of East and West daylight. They imagined large flexible spaces sensitive to their work needs. In contrast to the open studios, their bedrooms were enclosed and private. The bedrooms have skylights and beautiful windows looking to the studios. The windows would be wood framed and salvaged or individually made with beautiful proportions, small panes, maybe even colored glass. Another center is a cozy library on the East loft, overlooking the hills. There is a couch, warm lighting and the feeling of calmness where in the late afternoon sunlight, Maurice can enjoy reading a book.

Raven focused on two main centers. One is her photographic studio the other one is the upstairs living center, which is removed yet open to the overall space. This is the only place that she envisioned to gather with friends and family,



Maurice and Moon's revised layout. Small changes made to kitchen, bedrooms.

where she can display her collectibles and work.



Raven's layout did not change. But she reduced her costs by completing finish details herself.

These significant centers, were further developed with our assistance to create the living quality which flourishes in spaces that are comforting and enriching. In order to help them refine these centers we experimented with different finishes and techniques that would bring more life into the spaces. Throughout this process we answered all technical questions such as structural framing, electrical wiring and plumbing layout but did not give suggestions to influence their design decisions.

Eleven Alternative Techniques And Materials

Throughout our process we explored many alternative uses of materials and created eleven simple low cost details. Our primary concern was to create refined details which were affordable, yet very powerful and effective in making a place that is truly alive. With the alternative examples we provided, the tenants were able to expand their ideas and freely use their creativity in enhancing their spaces. These alternatives were given as samples to the tenants who had the freedom to choose or create new details as the process evolved.

The tenants made primary selections based on the samples, but we encouraged them to hold off on making final decisions and refinements until the on-site development. To better enhance the centers full size mock-ups in the actual spaces have to be made. It is important to understand that

in order to make final design decisions one has to experience the space, its lighting, its warmth, its true feeling. Only these experiences can generate sensitive design decisions. Moon and Maurice selected minimal finishes for their work places- the white wall and unfinished floor are better suited to their work conditions, while in the library and bedrooms they developed a pine plank floor with repeating patterns.

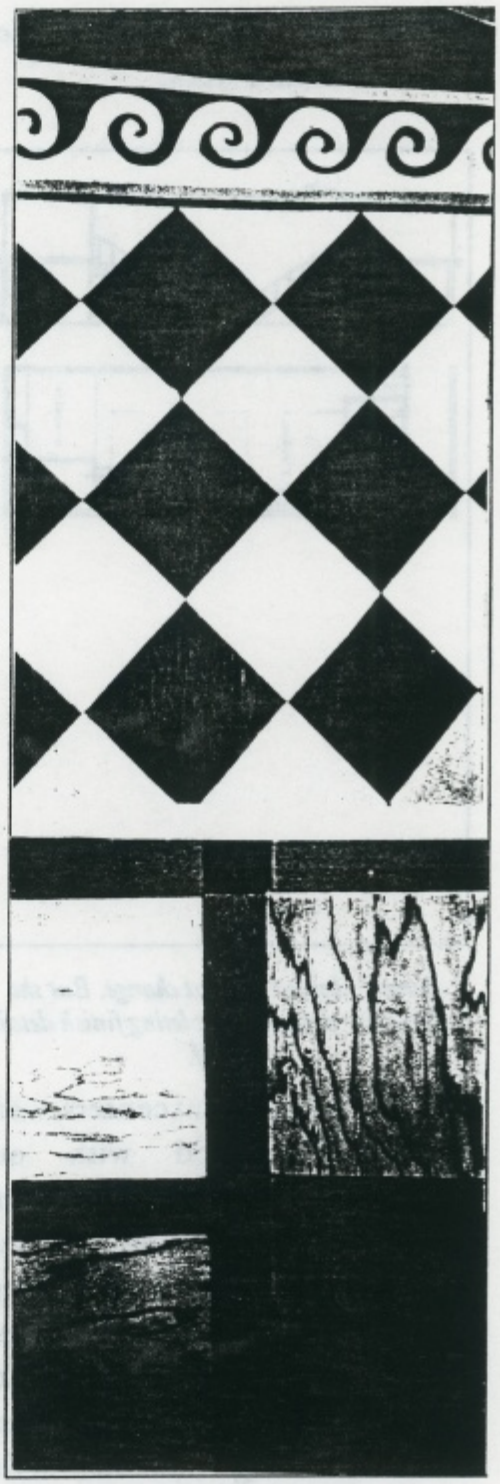
Raven really liked the plywood floor tiles and imagined seeing them in her bedroom and living room. She was also interested in applying texture and color to her walls.

▫ Floors

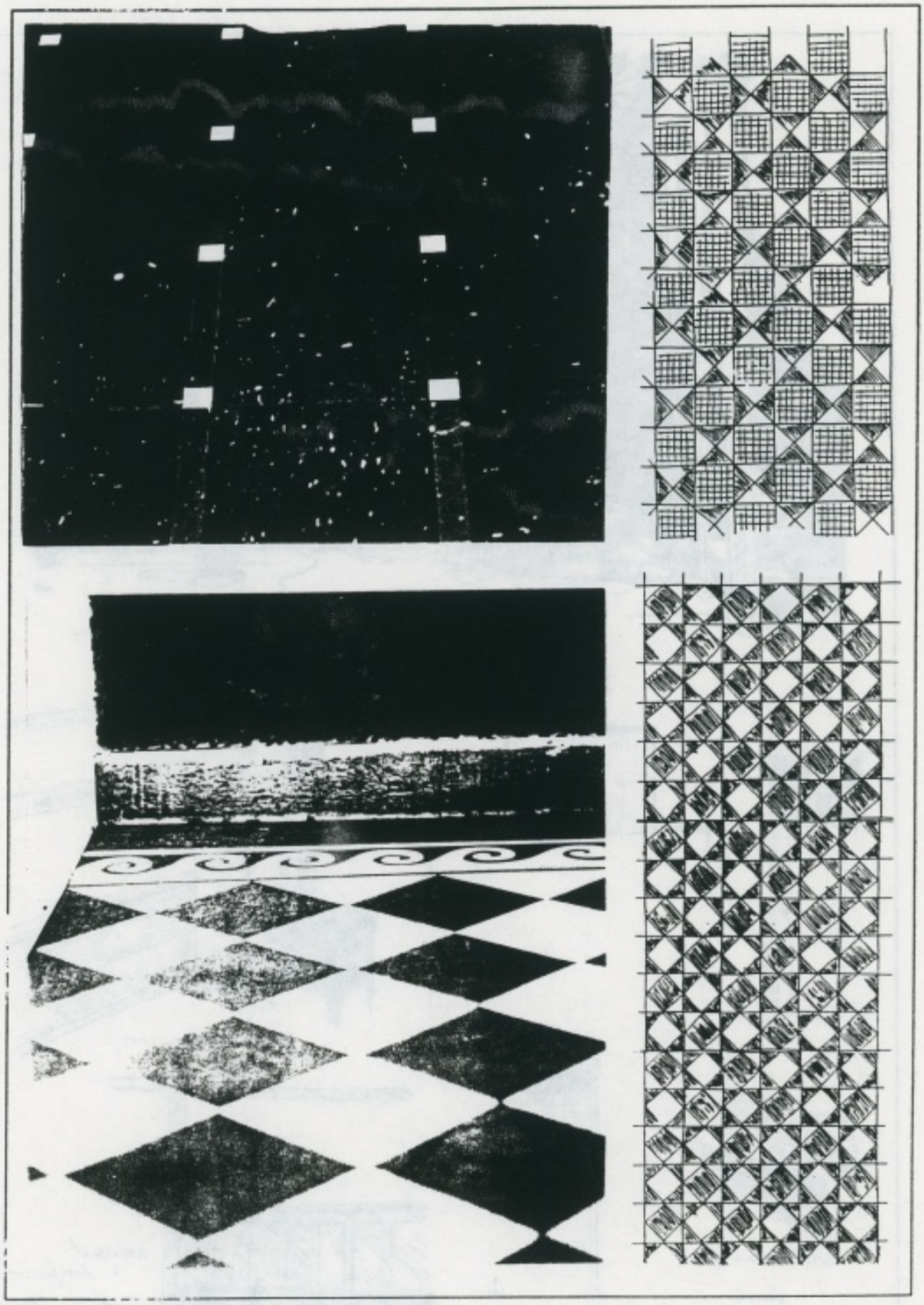
1. 12" x 12" Plywood with Douglas Fir border
2. 24" x 24" Plywood with douglas fir border
3. Painted geometries
4. Linoleum/Vinyl tile mosaic
5. Strand board w/ doug fir border
6. Particle Board w/ doug fir border

▫

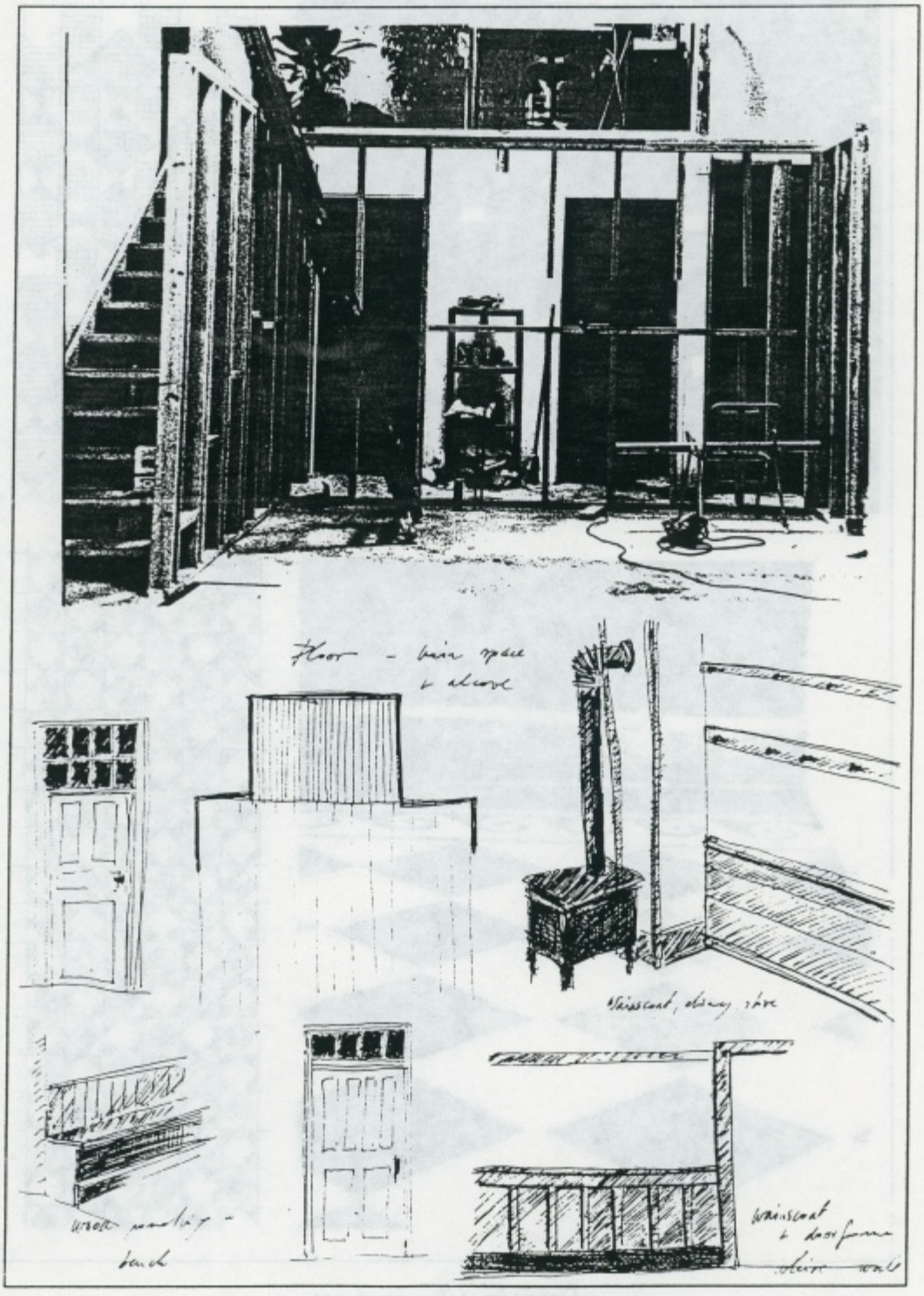
▫



Examples of plywood floor tiles



Examples of floor mock-ups.



Examples of other detail mock-ups.

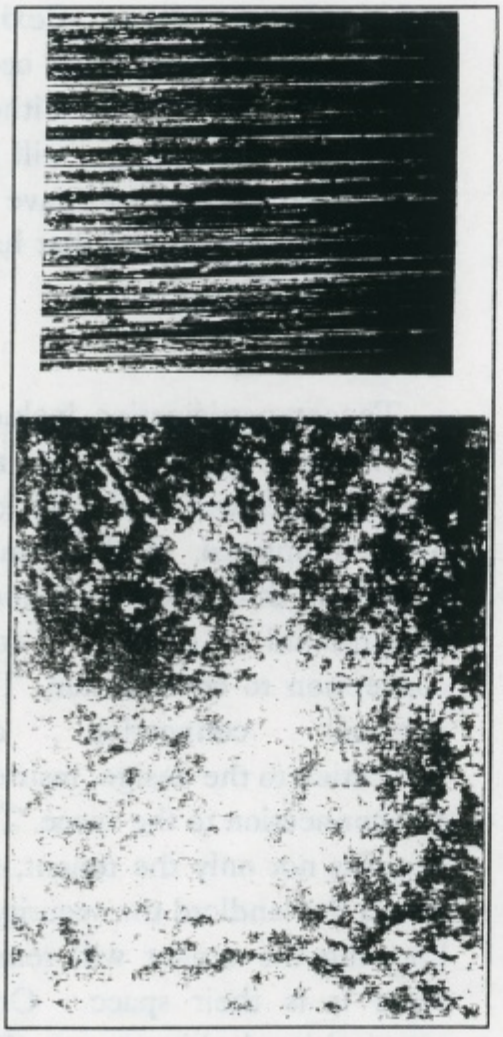
▫ Walls

7. Strand board stained on 2x4 framing

8. Exterior grade Plywood on 2x4 framing

9. Vertical board and baton on 2x4 framing

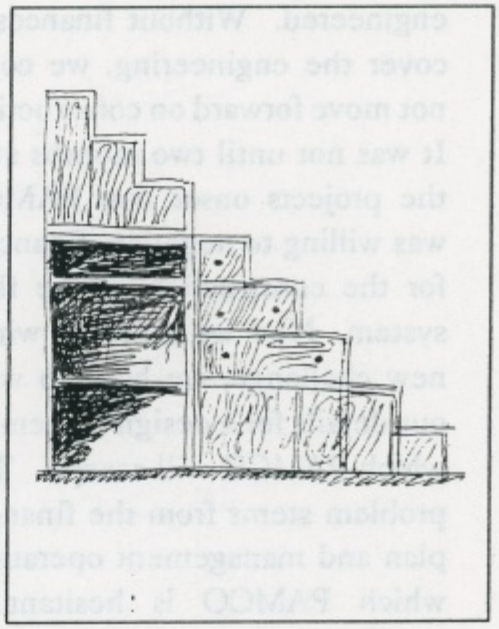
10. Horizontal lath boards on 2x4 framingCabinets



Examples of wall mock-ups.

▫ Cabinets

10. Stair storage



Example of cabinet mock-up

▫ Color

11. Layering - hand-painted finishes

Challenges

The first obstacle we faced was PAMCO's reluctance to accept a new process of design. They continually struggled with the idea of tenant involvement throughout the design development. PAMCO insisted on seeing models, layouts and complete cost analysis' before making any financial commitments. This was a major dilemma, because the

project depended on the construction of the structural floor system which needed to be engineered. Without finances to cover the engineering, we could not move forward on construction. It was not until two months after the projects onset that PAMCO was willing to negotiate financing for the construction of the floor system. Now we are faced with a new challenge, we have to work out details for a design agreement which PAMCO will accept. The problem stems from the financial plan and management operations which PAMCO is hesitant to accept.

The financial plan is based on material and labor costs which make up the subcontract. In addition to the subcontract, the budget includes a 10% contingency for each subcontract hard cost. This contingency is included to cover changes in the design, modifications that can not be determined until later in the design process. This fund allows for the refinement of special details later in the project's development and helps guarantee a defined budget.

Management fees are also included in the financial plan to cover the costs of on-site design development and construction management. These fees are 20% of each subcontract and cover the costs for planning and implementation of the design process. Project management is essential to the success of the project because it provides a continuous involvement by the architect and allows flexible change and modification to occur during construction. Without management the process will fail and the apartments will have no greater life than others that have been built.

Evaluation

Tenant participation includes the input of actual people, real tenants which will inhabit the lofts when completed. Each tenant is integrated throughout the entire design/build process from conception to construction. This personal connection and dedication to the design, insures a real connection to the space. This benefits not only the tenant, but allows the landlord the security of knowing the tenant will remain since it is their space. On a practical level, this process offers security to the landlord by creating

an extended five year lease agreement, during which time the tenant is encouraged to continue developing the space.

Through this unique process we will be able to bring to life more personalized space for the tenant and still significantly contribute to the overall value of property, insuring the landlords support and enthusiasm.

In order to gain a deeper understanding of the success and failures of our project we evaluated each step obtaining feedback from the tenants and analyzing the results.

▫ Dialogue of Patterns of Life

We initially began the project by asking each tenant to write a brief description about their daily routine and how their space would be used.

According to Liliana, she revealed to us that she benefitted greatly from this exercise. She is a writer and eloquently described her living patterns and daily habits. This not only helped her to clarify and priorities her own thoughts but it allowed us personal insights into what she was feeling and why she made certain decisions.

This exercise provided us with an outline for each tenant's "Way of Life". The tenants had the freedom to focus on lifestyles and personal patterns, embellishing on important aspects of their lives. This resource provided us with necessary information which helped us to understand the source of their decisions.

▫ Layouts

During this crucial phase we exhibited no formal control of the project. We encouraged the tenants to draw out their own spaces in plan and section.

These drawings revealed important information about strong activity centers and reflected key elements missing in their current living spaces. Each tenant had very different ideas about how their space would work. We were impressed with the level of detail, originality and variations in the layouts. These drawings successfully conveyed strong centers and definite ideas of integrating work and home spaces. The evolution of these centers would be carried out throughout the process.

According to Raven," Drawing the plan made me realize how much space I had to work with. It

was exciting to have so much control and I learned a lot by drawing the layout."

▫ Model

The tenants made the first round of decisions themselves. They discovered and confronted difficulties on their own. We did not step in to help them change anything.

It proved helpful for the tenants to solve their own problems. Wrestling with the problems formulated a greater scene of belonging and accomplishment.

After completed her initial model Liliana realized she had a problem with bringing light into her ground floor bedroom. She then realized she needed only to make a window in the wall to bring daylight in. This small discovery gave her a great sense of pride. Each struggles became a victory as she found and created solutions that were uniquely her own.

The models also gave the tenants a better physical understanding of the integration of the design process and construction.

▫ Budget

The cost/sf budget breakdown was a valuable tool to determine a fair construction estimate for each individual space. The square foot costs helped the tenants to understand the nature of varying costs, ie. amount of walls, where you place your plumbing and electrical. The tenants were better able to prioritize construction costs and did not create frivolous gestures. The $10,000 unit budget provided a good range of flexibility and inspired creative alternatives on how it could be distributed. With the limited budget, the tenants and ourselves were forced to come up with alternative methods and materials to lower the costs to make walls and floors.

Summary

We have created three unique apartments, each having its own significant, each having a greater feeling of "home", the living quality we have sought. Although these layouts are diverse, they have a genuine feeling of belonging and the flexibility to be used in other ways by future tenants. The importance of this project is to understand the nature

of user design and its relevance in architecture. Through this personal approach, a greater sense of belonging can be generated creating an environment that has a greater quality of life. Furthermore, we have shown that low cost housing can be just as beautiful and enriching as high end housing, as long as there is a process which supports this fundamental focus. The constraints of budget do not have to limit the possibilities of new and improved low cost housing.

A Garden for a Winery
Transformation of Positive Structure During an Incremental Building Process

Meg Calkins Stueve

In this paper devoted to landscape, Stueve examines a very important general case: the case of a landscape developing incrementally through time, in such a way that every single step does something to extend and preserve the structure. I believe the application of process-ideals to landscape is easier, and more pure, than their application to buildings, which are more complex in three-dimensions. This case is therefore unusually clear as a prototype.

The paper deals with a case of an Oregon landscape & garden, developing incrementally under the impact of structure preserving transformations. What is also interesting, is that she tries to demonstrate a practical process in which each structure-preserving step is taken with the agreement of client, and in a way which is demonstrably objective and shared.

She shows this first for the development of the landscape, placing of orchard, bench, shade trees, building, paths, and so on. She then takes the same process and shows how it applies, in microcosm, to the formation and design and construction of a single wooden bench, which appears in the landscape as an element.

From this paper we have the picture of a single process, governing landscape and detailed built elements. It is interesting that the author claims — though only to some extent proves — that the steps in this process are sharable and objective.

Perhaps the most important point is that for the few steps taken so far, Stueve shows that the objective improvement in the landscape, which she achieves, comes from this process. It is especially interesting that Stueve also tries to show the minute steps in design and construction of a bench, being guided by the same considerations as those that guide the step-by-step development of the landscape.

Looking east into the site and the valley beyond.

Introduction

An understanding of the structure inherent in a place combined with a simple intelligent response to, enhancement and transformation of this structure is critical to the life of any building project no matter how large or small.

In this paper, I will explore the processes required to preserve and enhance the structure of a site during an incremental building process. I will examine three different phases in the incremental building process of a garden for a winery outside Portland. At all three steps, the processes were performed with the major life giving goal of understanding the existing centers on the site and transforming those centers with built objects that actually preserve, enhance and grow out of the structure of the site.

In simple terms, the process which I followed to produce an orchard, a meadow ringed with shade trees, and a bench was completed by the use of structure preserving transformations - a critical component of any building project. The concept of structure preserving transformations involves a complete understanding of the existing structure of a site (the major and minor centers, their connections and the way that they support each other) and then the addition of built forms or objects which transform and enhance these centers. Each step of the process must enhance the centers before the next step is undertaken. This concept seems to be such a simple

thing, yet it is quite difficult to understand and achieve.

I have discovered during this project that this goal is slightly easier to achieve in a landscape architecture project than in an architecture project for the following reasons. First, landscape architecture is inherently more sensitive and responsive to the land, its contours, and vegetation as the land is a landscape architects palette so to speak. Landscape architects work with and shape the land to create their places whereas it is quite easy for an architect to just place a structure on the land. Also the materials of landscape architecture are often more natural than architecture. We use trees, earth, shrubs in addition to built forms to create places so it is easier for our projects to enhance the structure which exists on a site.

It is my intention in this paper to explain the processes which I undertook on the winery garden in the hopes that others will understand them, and possibly be able to reinterpret and apply the knowledge to other building projects.

An Evaluation of the Success of the Structure Preserving Transformations in the Winery Garden

The major difference between the following process and and average design build process is that all decisions about the physical form are made in response to the existing structure of the site. This means that the design process is of the site not of an individual ego. I won't deny that egos are involved with this process since individual interpretations of the process steps may vary slightly, yet the goal is to preserve and transform the structure of the site through an honest and personal exploration of the structure, not to create something that the designer likes or dislikes.

This type of process will create a place with life and beauty because it is a straightforward simple approach where there is a very good reason for every design and building move that is made, it is not subjective or meaningless. I feel that this is evident in the following processes for the winery garden and bench. The places that were created have more life because they are simply an honest

transformation of the site. I struggled, along with input from the client, and the participants in the Atelier, to develop a process to transform the centers of the site as honestly and simply as possible. I say struggle because I found it very difficult to break loose of all the preconceived notions of design that I have developed in other professional experiences and look deep within myself to understand what the site's structure really required. However, when I was able to do this, and convince others to do it, I felt that the built forms that emerged were a response to the site that possesed life.

The shade trees which are planned to surround a meadow in the center of the site and an orchard in a bowl shape at the top of the site are both extremely simple responses to the site, yet when planned, tested, and examined, they feel as if they are the only possible response to the site.

The process for the bench on the hillock, though a smaller piece, was even more difficult because the temptation to design subjectively was there in the smaller decisions about the form. Yet I feel that by constantly examining the center that contained the bench and asking how it is of the center and affecting the center really kept the focus directed to create a more honest bench.

The Process for the Garden - A Meadow and an Orchard

The challenge of incremental building was explored at two scales this fall in the building of a winery garden and bench outside Portland Oregon in Washington County. The site is located in the foothills of the Chahalem Mountains overlooking the Willamette Valley, Mt. Hood, Mt.Adams, and Mt. St. Helens. The entire property is about 20 acres of land comprised of two hillocks and a draw in between. Around fifteen acres of Pinot Noir and Pinot Gris vines were planted about five years ago on the hillocks leaving the five acre draw open in between.

The clients, a couple who own the winery, are eventually interested in building a house , a wine making building, and a beautiful garden for visitors to this property. Due to limited

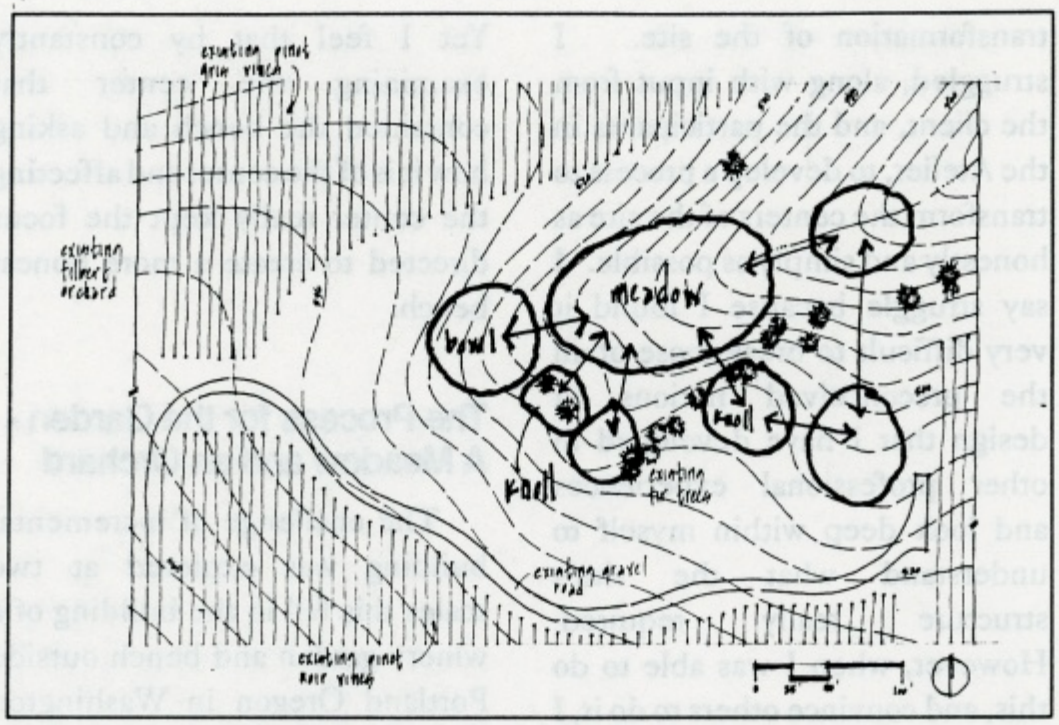


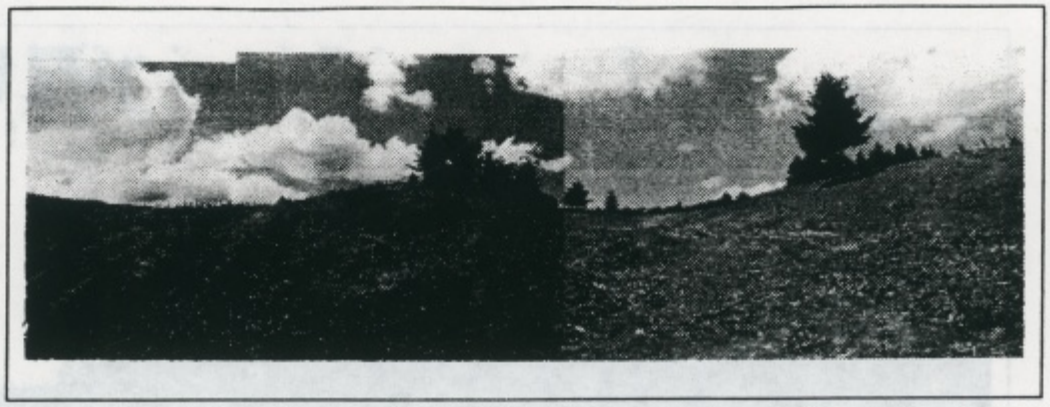
Diagram of existing site structure showing centers and connections..

finances, the house and wine making building will not be started for two to three years, however, it is important to the client that portions of the garden be planted now and allowed to grow.

▪ 1. Diagramming the Existing Site Structure

The first step of the site design and planning process was to diagram the existing site structure. The site is very rolling topographically with a lot of variation of hillocks, small valleys, and draws. There was not much vegetation as the site had been recently cleared of blackberry, thistles, and other wild plants and grasses. The few Douglas Firs that were struggling through the dense cover were left during the clearing and they along with the distinctive topography define the structure of the site. However, the topography is far more distinctive than the Firs.

The client and I diagrammed the structure together because she was unsure of the meaning of centers, structure and connections. She also does not have any graphic training however after a simple discussion of



Site photo looking west up the draw.

definitions we were able to pinpoint and graphically diagram the structure of the site. We started by trying to identify the major center of the site, then the minor centers and the connections between the centers. We discussed the centers hierarchy and how they support and relate to each other. It was somewhat of a pleasant surprise that we had precisely similar ideas of the structure. However, the structure is very strong and apparent on this site so it is a good one to study.

We both saw the major center of the site as the large, long, deep middle space shaped by the draw which runs from one end of the site to the other. This is clearly the focal point of the site with all other centers being connected to it and supporting it. It is a well enclosed space as it is surrounded on two sides by steep slopes up to the vines. This center is the true heart of the site. It is where every one goes to feel than they are really in the garden and all paths through the site end up here and focus here. In addition, the orientation of this space is directed out to the mountains and the valley beyond.

Another important center is a bowl shaped space at the head of the draw which flows into the long major center. Being almost a perfect bowl shape of about sixty feet across and 10 feet deep, it is the place that everyone naturally moves into the garden and pauses. Currently it feels quite exposed and slightly windy but it is still a very powerful center.

There are two centers off to the side and overlooking the major center which are small hollows.

Small hillock overlooking the main draw.

The first, near the top of the site is about 15 feet deep and surrounded by two small hillocks. Visibility out of the space is low with the only orientation out into the main draw. It is a small comfortable space but very secluded and does not have a strong effect on the other centers in the site. The other center is located near the eastern boundary of the site down the hill. It is located in a lower part of the site but is still high enough that it overlooks the bottom of the main draw. It is about 20 vertical feet above the bottom of the draw and separated by a steep hill so there is little connection to the lower space.

A small but powerful center exists on a small hillock which overlooks the long draw and most of the rest of the site. The actual space of the center is about a 12' x 12' area but it is the place where on this five acre site most people gravitate. The client pointed this out during our analysis and throughout my association with the site I have found it to be true.

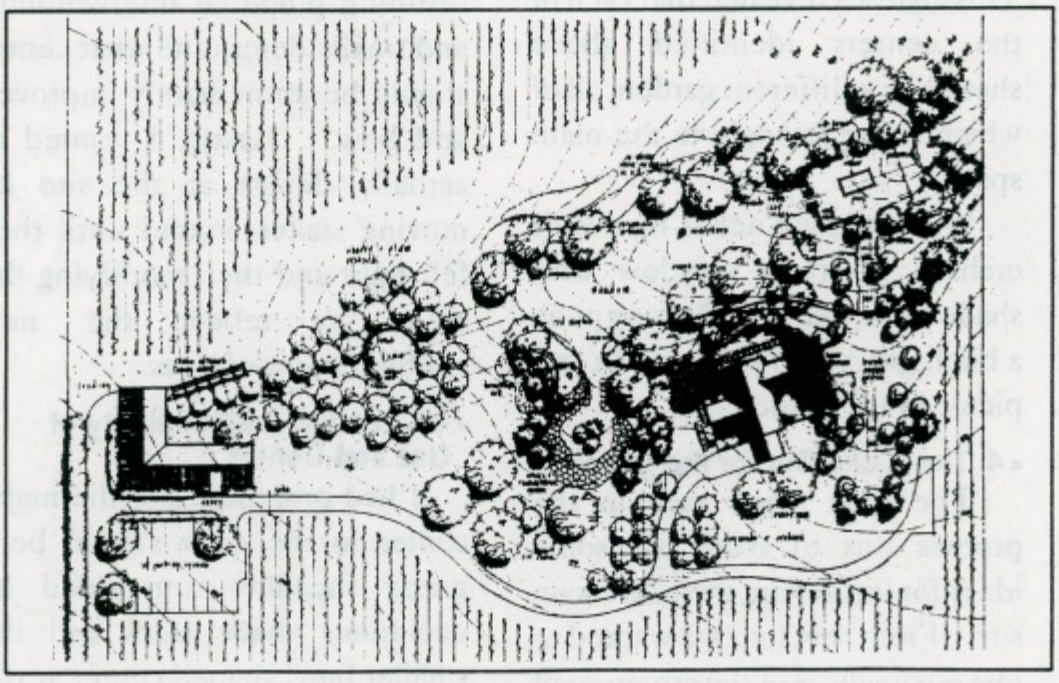
Lastly, another powerful center is not a space but a high point toward the far end of the site which overlooks the major center, a small hollow and the far

landscape. Currently it is not a place that one feels comfortable occupying since it is so exposed yet when there one feels its potential as a strong center

- **2. Defining the Centers to be Enhanced**
- **and**
- **3. Potential Uses**

Once these centers were established and confirmed on site, the client and I spoke of her needs for a garden, a house and a wine making building. We discussed and sited possible locations for the buildings, however, since the garden will be built before the buildings we concentrated mostly on the garden program. We both agreed that the building locations would come out of the structure that the garden would make. At this point in the process, the clients enthusiasm was overwhelming. She had many ideas for what she though could happen on the site, many of which seemed to be very thoughtful and well suited to the sites' structure. We also seemed to be in agreement about what direction the project should take.

From our analysis of the site structure, I went to the drawing



Plan of ideas and potential uses for the garden.

board and did a garden plan for the five acre piece of land. This phase was used mostly to ask and explore what gardens or uses might animate the existing structure of the site, and to identify the opportunities to enhance the centers. The main result of this step of the process was to identify possible uses in the various centers which could be kept in the back of our minds as we planned the first building phase. This step was also used to understand, visualize and clarify the general structure that will result from the existing site structure and any future building. This analysis revealed that each of the centers identified above should be a different garden, all of which relate strongly to the main space.

We discussed needs for a fruit orchard, a grassy meadow with shade trees, a small reflecting pool, a birch grove and places to sit and picnic in the garden.

▫ 4. The Stake Out for the Garden

The next major step in the process was to stake out some ideas for improving the centers on site. From this step we wanted to test our analysis of the structure of the site, the appropriateness of the resulting proposed interventions, and finally determine what center should be immediately improved and how. Lastly, I wanted to actually design at the site by moving stakes around until they felt right and then modifying the plans to reflect the new configurations of trees.

Staking out the meadow trees.

▫ 4a. Testing the Suitability of Use and Center

I had proposed that the major center in the draw should be a grassy meadow surrounded by deciduous shade trees and the smaller bowl shaped center at the top of the draw be a cherry and

Stake out of the orchard trees.

plum orchard. Both of these areas were staked first as they seemed to be the most certain improvements to the existing centers. The shade trees and meadow enhanced the sites structure quite well however, the shape of the meadow space was slightly bent so the locations and spacing of the trees were adjusted and readjusted continuously to accommodate and enhance the existing topography. Another strong feature of this center is its axial nature so the tree locations were also adjusted to accommodate this. The client, myself and a friend who was helping with the stakeout all felt quite strongly that we could visualize the quality of the meadow with its surrounding trees from the stakes. The initial stakeout of the orchard was surprisingly successful with the grid of trees that I had proposed on the plans overlaying the shape of the center almost perfectly. My friend and I could see this immediately as we were laying out the stakes and we were both excited by the enclosure and levels of scale that an orchard could produce in this bowl shape. The client initially reacted to the

layout that we were proposing with enthusiasm for the orchard but she felt that the trees were to close together. We talked alot about the eventual size of the trees and came to realize that she thought that the trees planted would grow much bigger.

▫ 4b. Enclosure and Spacing of trees

The client and I also had differing opinions about the amount of enclosure that is necessary in both the orchard and the meadow to enhance these centers. I believe quite strongly that the orchard must be a well enclosed and defined space which gives a feeling of shelter as one enters the garden. It is clear from the bowl shape of the center, that the middle of the orchard must be left clear and open as a space which is human scale and comfortable. The client and I both see it as a space for guests to picnic in the clearing. However, our opinions differ on the spacing of the trees around the clearing. She felt that the orchard should be very open with only a few trees. Eventually I was able to convince her with the staking that the strength of the open clearing in the center of the orchard depended heavily on the amount of enclosure that the surrounding trees provided.

We also examined closely the transition of the regular and relatively dense spacing of trees in the orchard to the more open and irregular layout of the shade trees surrounding the meadow. The topography of the site dictates that the level of enclosure in the bowl center of the orchard should give way to a grander and more open level of enclosure in the meadow, the main center of the site. We both agreed on this important idea and this led to a revised, more open layout of trees around the meadow.

▫ 4c. Smaller Centers Created by Placement and Size of Trees

The spacing, placement and the number of the shade trees around the meadow was also refined by the stakeout on site. Some issues that were considered at this stage in the process were: the connections to the centers adjacent to the space, the physical proximity to the surrounding elements, the spatial quality of the meadow as a whole and the smaller centers being created between the trees, The shade trees selected were based on the height and degree of enclose that they would

provide, and they were grouped by species to reflect the smaller centers within the meadow.

Another very successful part of the stakeout was the decision to locate a bench on top of the small hillock under an existing Fir tree. We both agreed on the need for a bench in this location since most of our meetings on site took place on this point and all visitors to the site seem to migrate here. I believe that the center is so important because it is very separate from the rest of the site being elevated on a small hillock and it is a relatively small and intimate place. The exact orientation of the bench was adjusted until it addressed the draw below as well as the surrounding landscape.

The house and winery locations were staked as well as a possible birch grove in one of the hollows and a smaller garden with a pool at the bottom of the draw. We were less sure that these configurations or locations would enhance the existing structure of the site at this point in the building project so the above processes were not repeated in an in-depth way.

The entire stakeout process was one of the most exhilarating steps in this entire process, because we could all visualize what the site could be and we could feel quite strongly what was right and what wasn't working as well. It allowed us to understand and be very clear how the structure of the site would be animated and enhanced by the proposed gardens. It also prompted us to realize what interventions seem the most crucial and will produce the most positive structure with the largest impact and improvement on the site. Lastly, we were able to decide exact locations of some elements and really understand how they will alter the structure of the site.

Unfortunately the client did not have the finances to plant the shade trees in the meadow and the orchard all at once so we debated briefly whether we should try to install a little of both centers or just concentrate on improving one center at a time. We decided that to vastly improve one center is better than small improvements on two. It was determined that if we planted all the shade trees proposed for the meadow it would give the existing topographic

structure a vertical dimension that would ultimately effect all of the centers on the site in a positive way. It would also improve the hierarchy of centers by making the main center a place that is more pleasant to occupy.

Another small element that we felt strongly would have a very large impact on the structure is a bench on the hillock. These two constructions one quite large and the other very small were chosen to be the first of the garden.

▫ 5. Model and other testing of shade trees

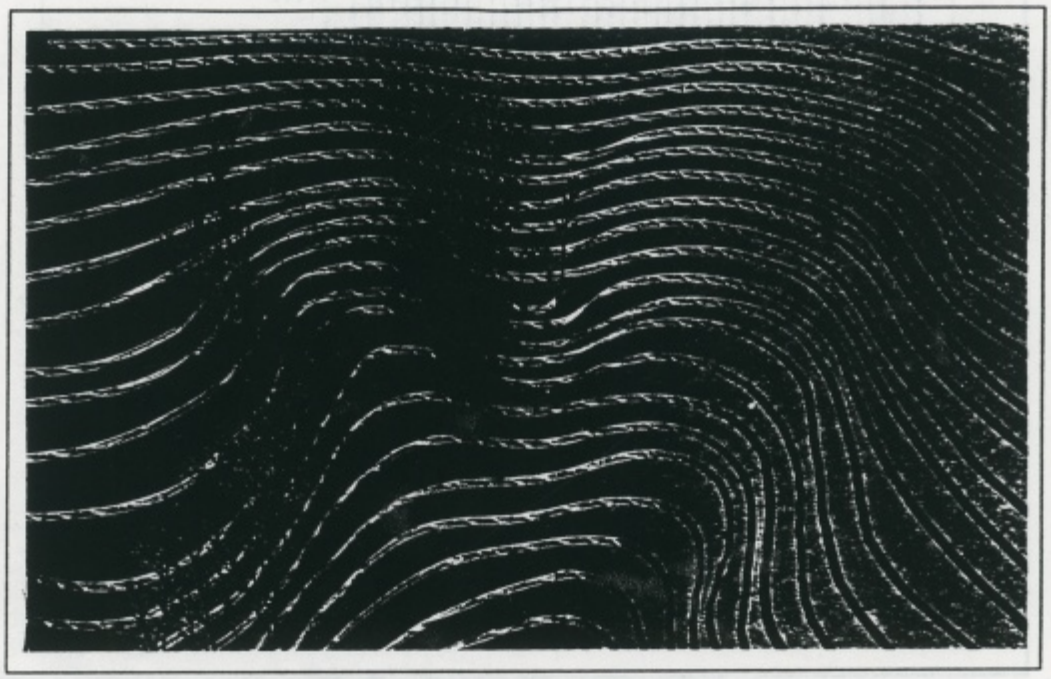
Even though the shade trees had been staked out on site and the locations finalized, I felt as if I should check their heights and massing to make sure that the proposed layout would produce that kind of life for the center that I thought it would. I built an accurate topographic model of the entire site and then put trees on it that were modeled to the correct height and canopy of ten year old trees. I asked other participants in the Atelier to look at eye level at the space that is created by the trees and to give their evaluation as to the degree with which it helps the center. From this I refined only slightly the layout of trees around the meadow.

▫ 6. Specification of tree species

Throughout this process I have had in mind the kind of shade trees which I would plant around the meadow, but at this point the client and I chose specific species which have the form and color characteristics that we felt would enhance the space. It was important to us to use species that grow readily, and in many cases, are native to northern Oregon.

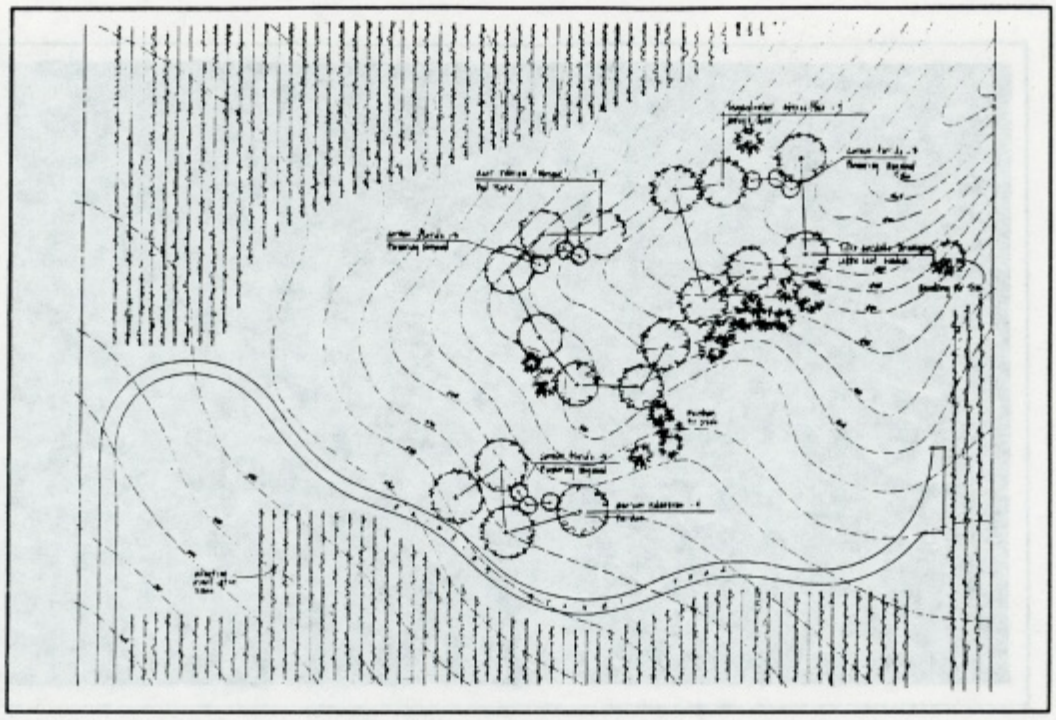
▫ 7. Search for a contractor

After I prepared a standard set of construction documents for the shade tree planting, I found a landscape contractor who would install the plants for a very reasonable price (about 30 plants for $3,000 including labor and soil amendments), who also seemed interested in the process that I had been following. We were ready to begin construction when the client seemed to be stalling on the project. She remained quite enthusiastic for the planting (she was wanting to cut down on the cost) but her husband, the other investor, was not as sure about the project. In retrospect I feel that he was less sure of the planting



Model of site with existing fir trees.

Model of site with proposed shade trees.



Model of site with existing fir trees.

because he had not been involved at all in the process which produced the shade tree layout, so therefore he did not feel a deep connection to it. Consequently, the planting of the shade trees and the orchard has been delayed until March.

The Process for the Bench on the Hillock

A major goal for the design of the bench that was planned for the hillock overlooking the site was that the existing site structure would influence all aspects of design and construction of the bench from the placement on the hillock to the small centers of the bench itself. In other words the bench would be created out of the structure of the site and its life would come from the site. The following is an explanation of the

step by step process used in creating the bench. It must be stressed that the steps were performed one at a time in the following order and the next step was not addressed until the previous one was established as the best response to the site's existing centers.

▫ 1. Define existing center to be improved

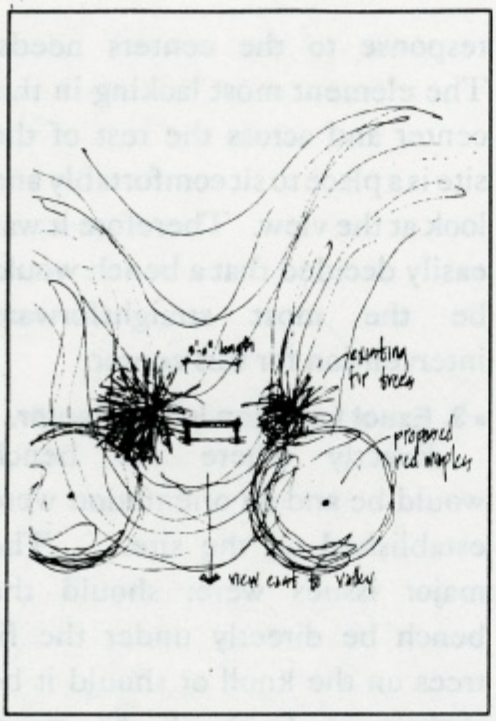
The first step was to define an existing center on the site that should be improved. The center that was chosen in the planning process for the bench was already a very strong center on the site. It is a place where visitors to the site naturally gravitate because it is small, high and relatively well enclosed with two existing fir trees. It overlooks almost the entire site as well as looking across the valley at Mt. Hood, Mt. St. Helens, and Mt. Adams.

▫ 2. Define Use

It is clear that the existing center is very strong and that a simple intervention is all that is needed to strongly enhance the center. There are many different types of interventions that could support this center but it is important to provide the most simple and straightforward response to the centers needs. The element most lacking in this center and across the rest of the site is a place to sit comfortably and look at the view. Therefore it was easily decided that a bench would be the most straightforward intervention for this center.

▫ 3. Exact Location in the Center.

Exactly where the bench would be and its orientation were established on the site. The major issues were: should the bench be directly under the fir trees on the knoll or should it be slightly in front of the trees. Through the use of stakes and sitting in various locations on the knoll, it was established that the bench should be only slightly in front of the tree trunks but still under the front edge of the canopies. The feeling of enclosure felt quite good in this location. The exact orientation of the bench was established next. The bench could turn slightly and look down into the draw or it could face straight out into the valley, or any degree in between. If the bench faced straight into the valley, it was looking in the foreground at the other major knoll on the site. This positive form was more of a barrier to the



Sketch of bench in plan.

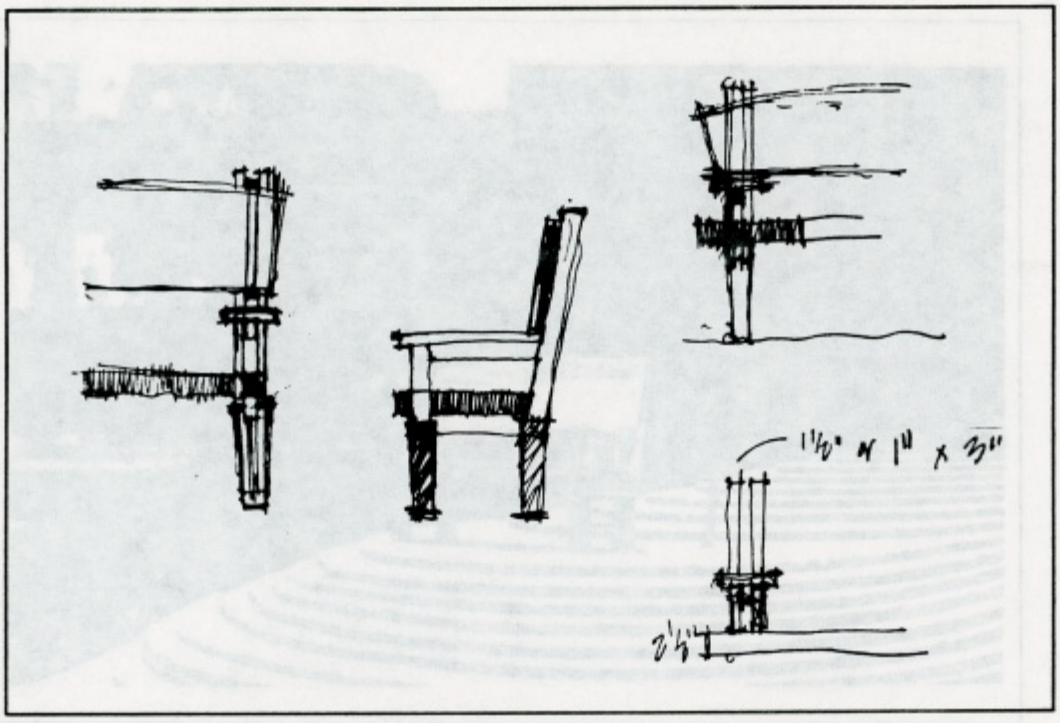
bench and the view than if the bench looked down the hollow shape of the draw. As a result, the bench was turned slightly to address the draw and the valley beyond.

▪ 4. Shape of bench in plan.

It is at this point that the design process for the bench came indoors so to speak. As much information as possible was collected and documented about the knoll and the site but the site/studio location separation dictated that many important decisions be made away from the site. Therefore measures were taken to replicate site conditions in the studio. A 3/4" scale model was built of the knoll and several watercolor paintings were made of the site. Briefly at the site and then in the studio it was established that the bench should be oblong and rectangular in plan. A curved shape was considered, yet the space at the top of the knoll is curved itself and it seems that a curved form would lessen the strength of the existing curves. In addition, the two fir trees straddling the knoll seem to form a line between them which implies a straight linear form. Most importantly the space on top of the knoll is wider than it is deep so that seemed to indicate a bench of a similar shape.

▪ 5. Material, Texture, Color

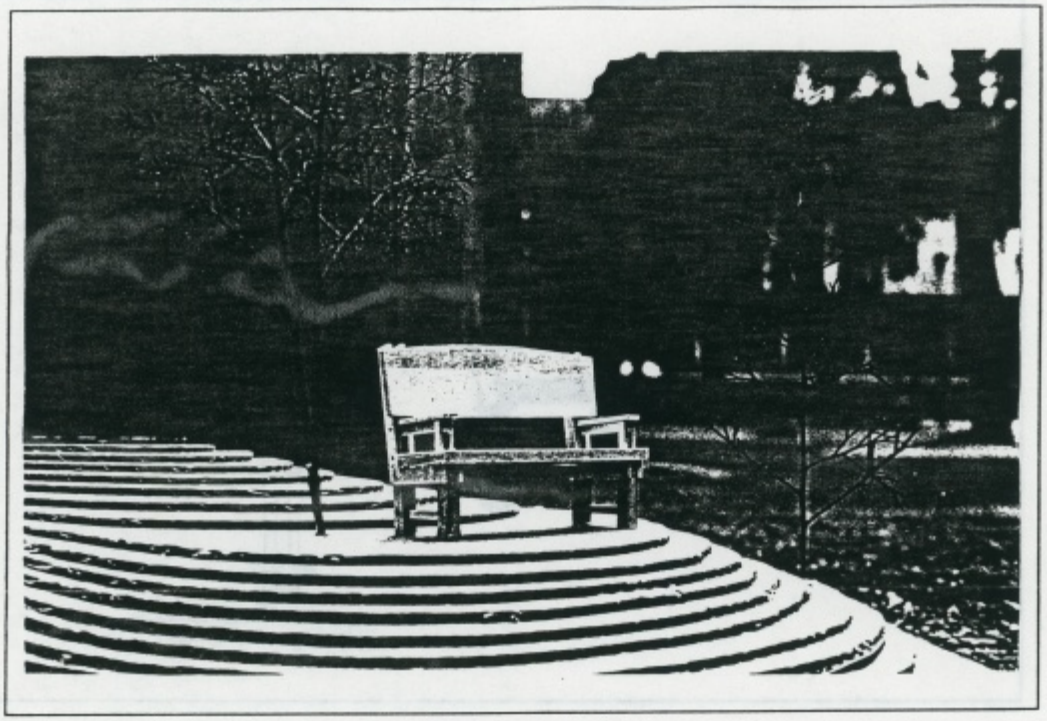
Before any more decisions could be made about the shape of the bench, the material and the general color needed to be established. Because this bench will be the only built form on the site for a few years, it was decided that it must be a simple element that is of the site, but yet has a presence that stands out. It was decided that the bench would be wood since it is a natural material, and can blend with the trees and



Design sketches of bench.

vines that already exist on the site. Wood is a warm and comfortable material which can handle the exposure of the location and it also implies a simple form with large members which the openness of the site requires. The roughness of the bench was considered next. It is necessary that the bench be fairly rough and simple since the site is not heavily developed and also it is a fairly small thing that is occupying a large landscape. However, the bench must also exist on the site when it is fully developed so it must not be too rustic. It was decided that the members should be large and simple forms, but that the material not be too unfinished.

The general color of the bench was also established at this stage. Colors that exist on the site were examined through a series of watercolor paintings that were made of the site. The most dominant colors were the blue sky, the yellow green of the vines, the blue green of the fir trees, and most of all the yellow/brown grass color. In addition, here and there the reddish color of the earth is exposed and this color exists in startling yet beautiful contrast to



Model of bench on hillock.

the greens and blues of the trees and sky. It became apparent that the bench should also be this red color of the earth, as it is natural within the site yet contrasts so strongly with the context.

▫ 6. Degree of Enclosure/space created

Up to this point in the bench design process, simple and straightforward decisions had been required and made, in what felt like a fairly objective process. However, when decisions about enclosure and form were required, I began to have an urge to break loose of this process and "design" the bench according to a more conventional design process which I have learned in other studios. I somehow had the feeling that I had to create something which looked high style and designed - something that an architect would do. I filled a sketchbook with several ideas for the bench, some of which had absolutely nothing to do with the site or its centers and I was very frustrated that nothing felt right. I went on with this process, not really understanding what the site required of the bench through several small models and finally a full scale cardboard

mockup, which made me clearly see the futility of what I was doing.

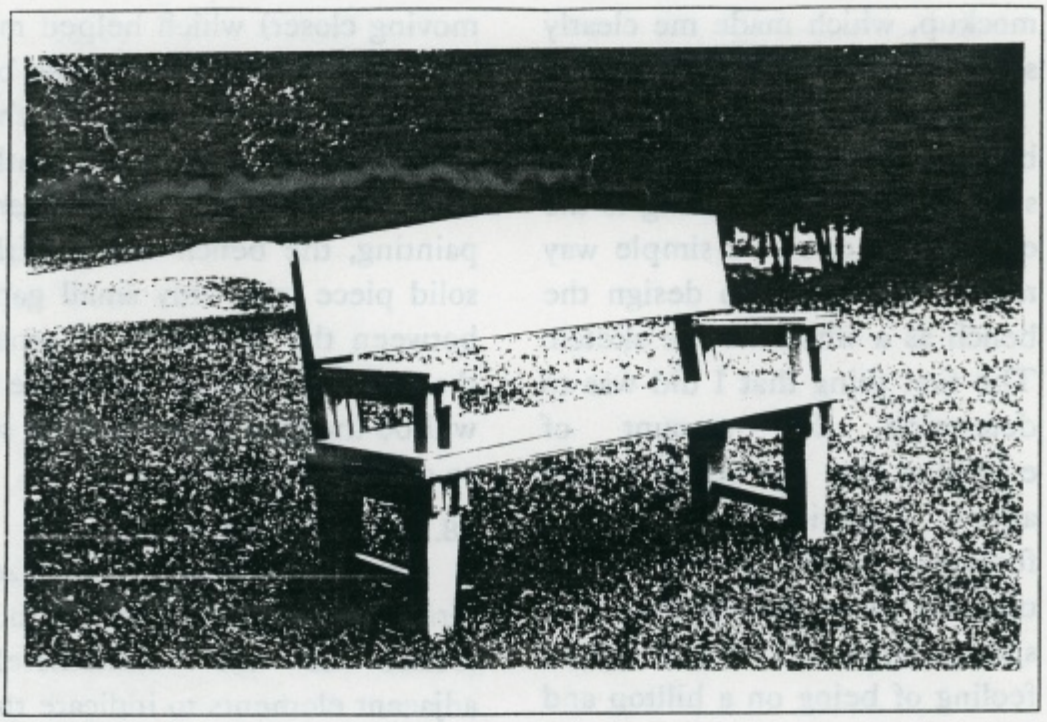
I realized that I needed to get back on the track of the step by step process of responding to the existing centers in a simple way rather than trying to design the bench as a whole in one sketch. The first thing that I did was to determine the amount of enclosure that the bench should afford. I considered the existing feeling of enclosure from the fir trees on either side of the bench space, along with the exposed feeling of being on a hilltop and from this coupled with the testing of several models, I determined that the bench must have a back. Also because the bench is on a hill, it needed to have arms to help contain the center of the bench. Overall, during this step I came to realize that the bench needed to be well enclosed at the sides and the back if it was to be a comfortable place.

▫ 7. Form

The next step, one at which I was also tempted to ÒdesignÓ the bench, was to find the form and shape of the bench. I did a series of watercolor paintings of the hillock with a bench from various distances (starting far away and moving closer) which helped me to realize that the form should be solid and that the back of the bench should be rounded gently like the hillock. In every painting, the bench was a fairly solid piece with only small gaps between the members. I sense that it needs to be solid because it will be the only built element on an open and rolling site.

▫ 8. Centers in the bench

Having established the size, form and enclosure of the bench, I looked to the immediately adjacent elements to indicate the centers in the bench. I knew that like nature and the trees on the site, nothing must be frivolous or wasted and every piece should work in conjunction with the others to support the bench structurally and aesthetically. I also knew that like the site there must be a clear hierarchy of centers with some repetition of forms. During this part of the process I tried to be very disciplined and not create meaningless gestures or gimmicks. I needed to be as straightforward as possible. As I worked at this, a system of double members fastening to a single member began to emerge as a



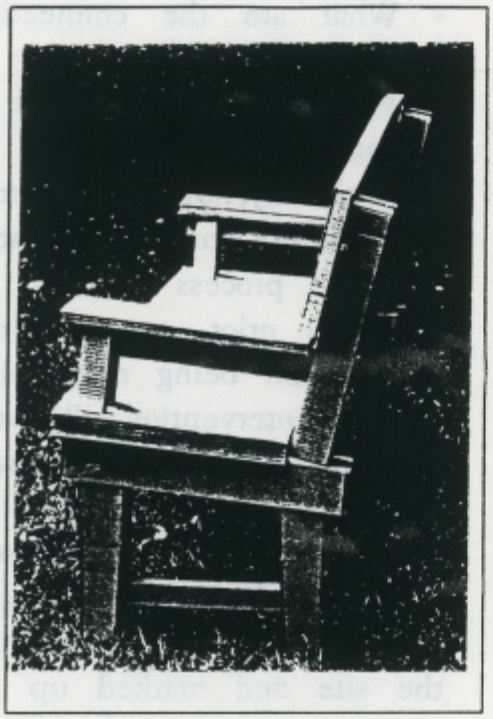
Full scale mock-up of bench.

structurally sound and natural method of organization. The rhythm of two and one is found in the branching structure of trees and it is also evident on the hillock with the two fir trees flanking the bench. Like in the trees, this type of member organization creates a natural hierarchy of centers and spaces.

It was clear from previous decisions and thoughts that the structure of centers in the bench must consist of a large center between the arms where two people could sit and this must be flanked by a hierarchy of smaller centers at the arm/leg assembly. My tool at this point of the process was a 3/4Ó scale model which I could place on the topographic model of the hillock and which was very easy to modify quickly.

▪ 9. Structure

I also looked to the trees for clues about what the structure and construction of the bench must be. The decisions that I made in the previous step dictated somewhat how I would make the bench stand up, but also this step defined the more subjective centers and member sizes. As I figured out what would make a strong bench,



Full scale mock-up of bench.

I worked on first the 3/4" model, but then I quickly moved up to a full scale cardboard model which I glued, unglued and cut up several times to refine the proportions and understand the connections.

▫ 10. Small Center, Large Center Relationships

At this point it became clear that the mechanisms necessary to make something stand can also be the beautiful details that are necessary for life. From this step, the relationships between the smaller centers and the larger centers in the bench became more refined, easy and logical. At this point I worked out proportions of members and spaces to make the bench both beautiful and comfortable.

▫ 11. Construction

The refinement process continues as I construct the bench from wood and I suspect that it will until the bench is on the hillock for a few years. As I cut the wood and make the joints I am still thinking about the site and the centers; and I try to continuously check that his will improve the structure of the site.

Suggested Steps to Maintain and Transform the Positive Structure of a Project During an Incremental Building Process

On the following pages I have laid out some suggested steps and questions which could guide a building process of Structure Preserving Transformations. This piece has resulted from the two processes explained in the previous pages and it is not meant to be a definitive process, yet is meant to be reinterpreted for each different building and site situation. The following process is structured so that it can be

repeated for each new phase of building during an incremental process.

It must be stressed again that each step must enhance the center and create life for the next step to be undertaken successfully. This is an additive process and if an early step is not right then later steps will not be right either.

▫ 1. Diagram the Existing Site Structure

Before any building is attempted on an existing site, the structure of the place must be diagrammed and understood both graphically and analytically. No intervention can have life if it does not respond to, enhance or improve the centers which exist in a place. To accomplish this, the following questions should be asked, answered and the answers understood before any intervention is made.

- What are the major centers which exist on the site?
- What are the minor centers of the site ?
- What is the hierarchy of centers?
- How do they support each other? What are their relationships?
- What are the connections between the centers?
- What is the hierarchy of connections?
- Generally, how is the structure of the site working as a whole?

This process should be repeated prior to any new intervention being made since each new intervention will have an effect on the existing structure of the site. For this step in the process I suggest that an existing site plan showing, topography, trees, buildings, etc. be taken to the site and marked up and diagrammed on the site moving around to each center. Feelings, enclosure, connections, etc. should be noted at that time.

This is the most important step in the process and should be performed as honestly and accurately as possible.

▫ 2. Define a Center(s) to be Transformed

The order of steps two and three can be changed around depending on what the individual situation calls for and often they might be determined at the same time with a back and forth kind of thought process similar to the orchard/meadow process discussed above.

In defining a center to be transformed one could approach the situation from one of two ways. You could determine a strong center and make it stronger still or you could choose a weaker center and try to improve it. In the case of the bench on the hillock, we chose a very strong center and made it stronger. This direction may prove to be more logical since often improving an already strong center requires less effort and can also positively affect weaker centers. Sometimes at this step a new center is created instead of improving an existing one. It is difficult to say if this is improving the sites structure or not, but the builder should be aware of this.

▫ 3. Define Potential Uses for the Center

This step in the process could be a very complicated one or it could be quite simple and straightforward. I must stress that the following questions will most likely have many right answers, however, it is very important that the answers given are the most simple and logical ones which will ultimately produce the most clear and logical built place.

- What use, space or product, might further animate the existing structure of the site and the center which will be transformed?
- In what ways will it transform the center?
- What perceptual relationship will the new built form have with the site structure?
- How will it fit into the existing hierarchy of the site?
- Will the new built form alter or shift the existing hierarchy of centers on the site?
- Will the existing connections between centers still function as they should or will they be affected by the new built form?

▫ 4. Shape of Space / Objects

The determination of the shape of the space and the placement of objects is the first step where actual physical form decisions are made. These decisions will be carried further in later steps of the process so it is imperative that they are made carefully and intelligently. If the form of the built project does not have life, then none of the smaller details will have life. These questions might help determine an appropriate spatial quality.

- Should the space or building be inward or outwardly oriented?
- Is it more a space or an object?- What envelope should be created by the objects?
- What is the degree of enclosure?
- How will people inhabit the space?

▫ 5. Location of Objects in Center

After the spatial quality is established and tested, the actual locations of objects which form the space should be examined. At this point it becomes difficult to direct the process with typical questions because all situations and scales are different and decisions must be alot more specific than the questions might indicate. In the bench process this step was fairly contained, small and straightforward whereas this was the critical step for the placement of the orchard.

- What should the actual physical relationship of the new built forms be to the existing centers/elements which surround it?
- Where exactly should it / they be?
- Should the intervention be larger or smaller than its surrounding elements?
- Should it be more or less visible than its context?
- What relationships should the objects have with each other within the center?

▫ 6. Material, Texture, Color

Specific decisions, early on in the process about the texture, material and color of the built form will allow the smaller more detailed decisions to be accomplished more easily. In the case of the bench, once the material (wood) and color (red) were decided I was much better able to visualize it on the hillock and to work out the smaller decisions of the form.

▫ 7. Small Centers/ Relationships to Large Center

In any built form which has life there should be strong relationships between the various scales of centers. Just as it is imperative that the bench relate to the center in which it is placed, it is also important that the small armrest on the bench relate to the large center of the seat and back.

- What might be the hierarchy of centers within the built form?
- Are there many centers which support each other in a complex hierarchy or should it be simpler?

- How might the small details and centers support the larger centers?

▫ 8. Construction and the Center

I assume that some basic decisions about structure and construction will have been made earlier in the process, however, it is at this point that centers and details can be refined by planning for construction and during the actual building process. A very important aspect of this process is the actual construction step during which design and evaluation should not stop. As I construct the bench I am checking my assumptions about centers and refining proportions continuously.

▫ 9. Evaluation of the New Site Structure

This crucial last step is really the first step of this process repeated. It is necessary to fully understand the effect that the new built form has on the site structure as a whole and on the center that has been transformed. If the structure has been preserved and enhanced, the new built form will have life.

Making Houses Personal Within The Habitat Program

Bethany Opalach

This the first of two papers on the Habitat program, reports on an important breakthrough in housing construction.

The individual character of houses is essential to the families who live in them. In experiments repeated in various countries, it has always been assumed that personalisation of individual apartments or houses will increase cost, (primarily by increasing costs of management, administration, and time), and is therefore impractical. Opalach, with Damelin (see page xxx) entered into the program of Habitat for Humanity as colunteers, and have analysed the housing production in a way that points the way to a simple and practical way of making houses personal, without increasing cost.

They began with a standard house, designed by one of Habitat's architects, and currently under construction in the Oakland project. They then asked various individuals what changes they would like to make in this house, to make it personal to them.

Remarkably, the changes requested by the different families fall into an intermediate range, which is both highly innovative and personal to aeach family, and yet limited enough so that the changes can be made, simply and easily, without increasing building cost or management cost. Out of some forty proposed changes, only one was of such a nature that it had to be rejected because of its cost implications.

The apparent fit between people's most cherished desires, and what can reasonably be attained by modifications of a standard house, is something unexpected and remarakble. As a result of Opalach and Damelin's work, The Habitat management have now committed themselves to starting a first pilot program to test this concept in practice.

This simple fact is of very great importance; in scale, scope, and possible benefit to people on earth, this and the next paper together would then rank at the top of the papers in this volume — just because of its potential for doing good, and the scale of good which it might do.

Introduction

When personal empowerment and ownership are made part of building the environment, a true sense of belonging can arise. What makes us able to create a truly personal and alive environment is the belief that we can create change in the spaces we inhabit. We often create ownership simply by taking an action, by saying, "This fence needs some flowers around it" or "I want a roof over the back porch so I can sit and look at the garden." This ownership means that we recognize the personal around us — the universal personal rather than the individual personal. It is what makes us feel that we know and are known by the world. Commitment, love and belonging are natural responses to this kind of relationship with the environment.

So, the first step in building a better environment is empowerment: to structure the process so that we can take direct action in our lives and environment. Ownership will result, and with it living architecture.

The purpose of this article is to present an example in which a real project has been injected with life by restructuring its process. It is also to remind building professionals that at the end of the design process, it's not just you and your drawings. It is you, the house and the owners.

Project Background

As Christopher Alexander writes in "Notes from the Editor," the students in the atelier were sent out into the world to try to manifest living architecture in a real project. The criterion for project selection was this: "What project can I do that will really make a difference in the existence of life in the world; what project will clearly do the most in this direction?"

I was looking for a nonprofit housing developer whose process might accept amendments. East

Bay Habitat for Humanity was a good fit; it's a volunteer organization in the early stages of construction of a forty-unit development. The idea was to propose a design process for Habitat houses that would allow an environment of belonging, harmony and life to develop. It was a big project to take on, one that had a strong political aspect, and I saw that it would really scoot me out the door and into the world. I was scared, but Chris was enthusiastic because of its large scope.

In the third week of the semester, I gained a partner, Isobel Damelin. Her enthusiasm and commitment helped mine greatly in the insecurity of the first two months of the project.

Statement of Intent

Habitat for Humanity is astonishingly successful. Habitat volunteers exhibit both generosity and personal effectiveness, which together make the process work. The intent of our project has never been to apply new ideas to East Bay Habitat, but rather to clarify the principles upon which Habitat is based and intensify them in daily practice.

The application of two of Habitat's principles to the process as a whole, would do the most to achieve Habitat's goals. These were taken from a 1986 Habitat for Humanity International publication, *How to Start a Habitat for Humanity Affiliate.*

1. "Habitat for Humanity is a people-to-people partnership ministry aimed at the development and empowerment of persons and communities, not

Street House, 105th Avenue

merely the construction of houses." (p. 76)

2. "Each family should have an opportunity to affect the design of their houses as much as possible. A budget should be established with a predetermined limit (e.g., $1,000) to allow the family to personalize their home with such things as picture windows, fencing, 1/2 bath, etc." (p. 79)

These ideas, when looked at together, have several powerful implications. The first implies that part of Habitat's commitment to the homeowners is to help through empowerment, rather than charity. The second principle is the clearest, most direct route to empowerment and a better environment, if integrated with the sweat-equity construction component.

Proposed Process

We propose a process which allows homeowners to design and build, themselves, changes to the standard plans. This will produce a more personal environment, give homeowners the skills to maintain the house and make more changes later. We presented the following proposal to East Bay Habitat's building committee:

- 1. All homeowners should be selected while Habitat is in the process of acquiring the site.
- 2. The architect designs a standard house type. He or she prepares a drawing which clearly shows what must not be altered during construction for structural or functional reasons.
- 3. Habitat organizes construction training for homeowners before project construction begins.
- 4. Together, architect and homeowner decide on changes to the house design, i.e., wall, window and door placement, porches, landscaping, ornamentation, color, and fences.
- 5. During construction, homeowners themselves build the changes to their houses, fine-tuning the designs as they go.

We hope that following these steps will produce a "bit of the environment to which people feel more deeply related and feel that it is owned by them, in a real, and emotional sense." The rest of the article will show how these steps mesh with Habitat's mode of operation, tell the story of how we came to this proposal, and set forth

the empirical results of our investigation.

East Bay Habitat for Humanity

East Bay Habitat for Humanity is a local affiliate of Habitat for Humanity International, a Christian nonprofit housing developer. Habitat builds houses with donated funds and volunteer labor, and sells them at no profit under a no-interest mortgage. Habitat homeowners are people who don't qualify for conventional home loans but still have some ability to pay, and who commit to investing five hundred hours of sweat equity in their house's construction.

The current project is an attempt to house people displaced by the 1989 Loma Prieta earthquake. Habitat is working on forty houses on twin sites in East Oakland. It consists of single-family houses on individual lots, with a building cost of about $35/square foot or $90,000 per house. The total project cost is $3.7 million. The stated goal of Habitat International is to build "simple but adequate houses"(How to Start a Habitat for Humanity Affiliate, p. 76); however, this is open to interpretation by each affiliate. Peter Waller, the project architect, believes that "The goal for all Habitat projects should be to create safe, stable and enjoyable places to live." (Peter Waller, *Planned Unit Development: Building Community on a Larger Scale, p. 9).*

Homeowners building trusses

Joel Mackey, the executive director of East Bay Habitat, told us in an interview, "Habitat believes that having the sweat equity and volunteer components works for both groups the same way. You come out here and you work on the site as a volunteer, you gain a sense of empowerment. You begin to believe that you can be an agent of positive change in your community . . . To actually

put in sweat equity on your house gives you the opportunity to dream new possibilities about yourself: 'I did this, I can also maybe try this.' This is part and parcel of the program."

Understanding the Difficulties with our Proposal

The first concern of East Bay Habitat is simply to stay afloat. They figure that they can't do anyone any good if they shut down for lack of cash, so fundraising and securing payment from homeowners are primary issues. Construction costs and schedule are also crucial, and greatly restrict house and site design. These needs are reflected in the desire for greater commitment from homeowners, simple low-cost construction (but not so cheap that the houses fall apart in five years), and a fast-track construction schedule so that administrative salaries are made the most of. But even after acknowledging all this, the people I met from East Bay Habitat still gave me the impression that they cared about the environment they were building and the homeowners' contentment with their new homes.

For this reason, there seemed to be something very odd about the homeowners not having been selected before construction began, much less before the planning and design stage. No 105th Avenue homeowners participated in the planning and design process for this development. Peter, the architect, said he would have loved to have had them.

We attended two homeowner selection committee meetings. This is where homeowner applications are reviewed and home visits reported on. The criteria for selection are current housing situation, ability to pay, good credit record, willingness to put in hours, and somehow there's a moral criterion too, though I didn't sense it came out of racial or religious prejudice. I remember a discussion about an applicant's "motivation," based on the family's having lived in the same basement apartment for twenty years. On the other hand, a woman with no work history was given a chance to prove that she had the "gumption" her interviewer saw as her potential.

It seems that the only real problem is that homeowners sometimes pull out if too much time elapses between homeowner selection and move-in. It should be possible to pass all applicants through the initial screening process, and then to maintain a pool of qualified people and only start interviewing once they've decided on a site.

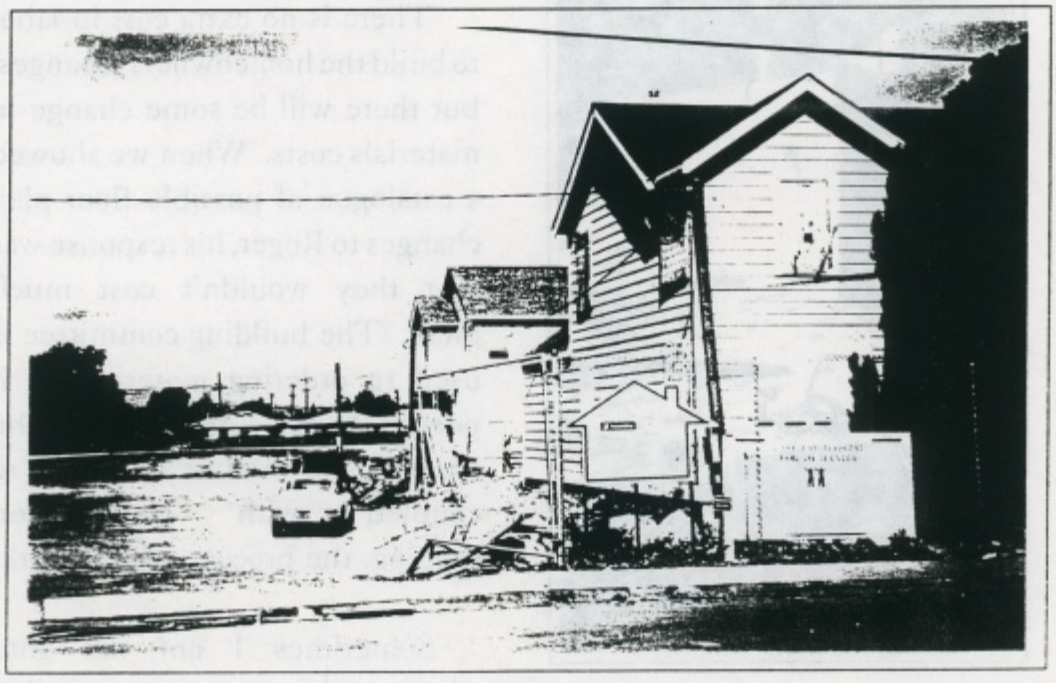
Another important issue is that volunteers (usually well-off and educated) are often more involved in building the houses than the families who will live there. Some homeowners are uncomfortable working on site and interacting with other volunteers, and end up doing peripheral work like stuffing envelopes and making lunches rather than actual building. This issue needs attention, because it denies homeowners the chance for empowerment which is integral to Habitat's philosophy. The free training would give homeowners job skills, maintenance skills, and more confidence on site. Roger Rushing, the construction manager, said he'd offered construction training to homeowners before but only if they organized themselves, and no

View from Street (see facing)

one took him up on it. He'd still like to do it, and Peter thinks it's important too.

The accepted idea within Habitat is that standardization and simplicity in house construction are the key to low costs. But so far, it doesn't appear that there's been a great deal of standardization. As we were framing the first floor of a "Street House," Roger told me that although three or four of this same house had already been built, the framing plans had never been worked out. In other words, the other houses are all slightly different, the problems having been solved as they came up.

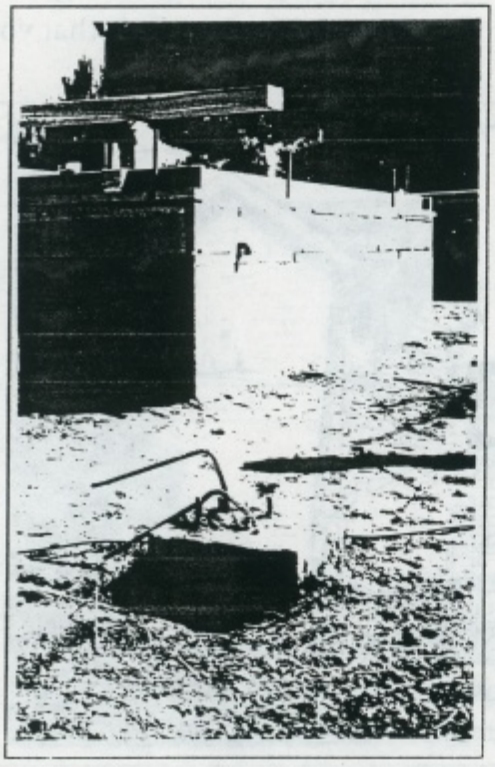
East Bay Habitat's goal is to make eighty-five percent of the person-hours on a house volunteer. There are some long-term, regular volunteers, but often whole groups of unskilled volunteers (fraternities, church groups) will come just for a day or two. This is crazy, especially when there's only one person (Roger) trying to direct the whole thing and teach new skills at the same time. Although Habitat doesn't really like working like this, in practice, the fact is that you



View from Street (see facing)

never know when construction volunteers will show up, or what skills they'll have. This virtually determines that the construction process cannot be standardized. Why not take advantage of the flexibility to make each house different?

One of the biggest issues we will have to deal with was the extra cost (in money or energy) of having an architect walk the homeowners through their decision-making and drawing up the changes. We thought we would have to impose limitations on the kinds of changes homeowners could make, in order to make the process feasible. But in fact, as illustrated by the drawings at the end of this paper, we found that the people who participated in the simulation were self-limiting, and nearly all of their designs were buildable.



Foundation detail

Part of our problem is to figure out what will happen after Isobel and I complete the testing phase of the process next semester. There is also the issue of Roger having to spend a little more time with each plan, so it he's willing to take on that extra work, we're over a big hurdle.

There is no extra cost in labor to build the homeowners' changes, but there will be some change in materials costs. When we showed a catalogue of possible floor plan changes to Roger, his response was that they wouldn't cost much more. The building committee is used to ordering materials as it needs them. As long as the changes are modest and they're coupled with construction training, the process should work.

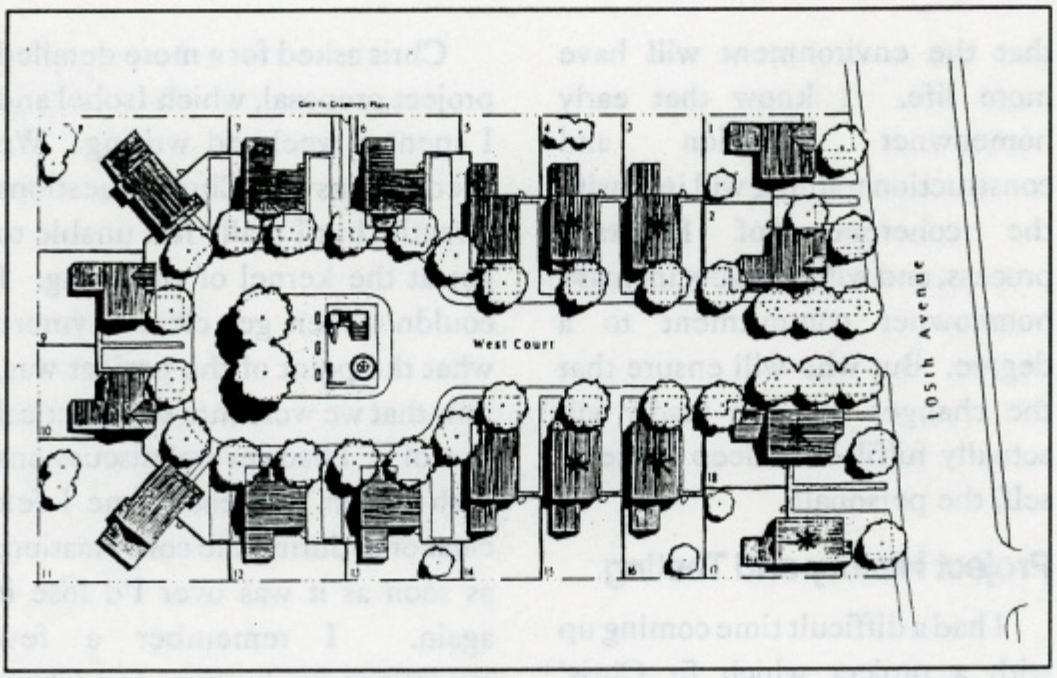
Sometimes I am not sure whether the proposal as we've outlined it above will guarantee

that the environment will have more life. I know that early homeowner selection and construction training will intensify the coherence of Habitat's process, and will probably increase homeowner commitment to a degree. But who will ensure that the changes that are made will actually fulfill that deep sense of self, the personal?

Project History and Testing

I had a difficult time coming up with a project which fit Chris' criteria — not "ego-centered," but the thing which would make the most impact in the world. We had a couple of weeks where the atelier was trying to define itself and the projects. Yodan brought in a short essay called "Letting Go," which brought us to realize that it had begun to feel as though people were getting too attached to the idea of controlling their projects. The class group had a beautiful session where we decided, by a gentle, slow process of talking it out (not a straight vote) which of the projects seemed to have the most potential to change the environment, whittled down the number, and teamed up.

Chris asked for a more detailed project proposal, which Isobel and I spent a weekend writing. We tried to answer Chris' questions directly, but I really felt unable to get at the kernel of the thing. I couldn't even get clear anymore what the point of the project was, now that we were into the practical part of it. I had several discussions with Yodan, and each time I felt clear only during the conversation; as soon as it was over I'd lose it again. I remember a few guidelines set by him and Chris, such as, "Make yourselves useful;" "Make your own private analysis now, without telling them what you're planning;" "How does Habitat's process thwart their goals?" "Come up with a process of how to cause change," "Find a concrete theater in which to develop your proposal," " Mentally take responsibility for construction management," "Figure out how to exert political power within the organization in order to get this stuff implemented," "Document your process," "Set it up so that the atelier could take on the design project next semester or next year." All of these things sound very reasonable and concrete to



West Court site plan (indicates under construction)*

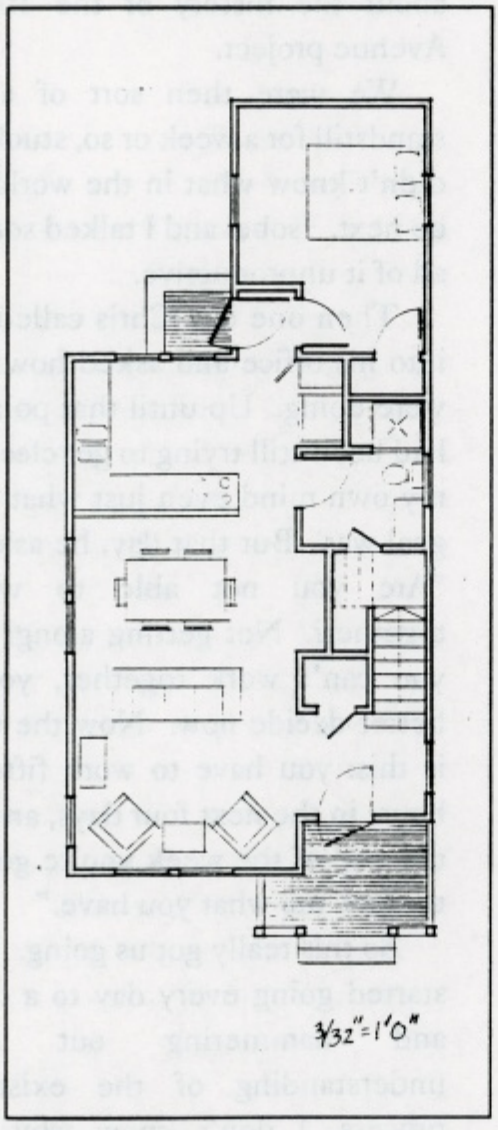
me now that I've had a chance to assimilate them and to grow a solid understanding of the problem, this thanks in great part to watching classmates work on their own projects. I began to see common elements in my classmates' approaches to varied problems.

In the beginning, I wondered, "Who the hell are we to waltz in and tell Habitat we're going to improve their development? The houses are quite good anyway, it's the site that's deathly. And does it really matter to Habitat anyway? Habitat International doesn't care about architecture, only about putting roofs over the heads of as many people as possible."

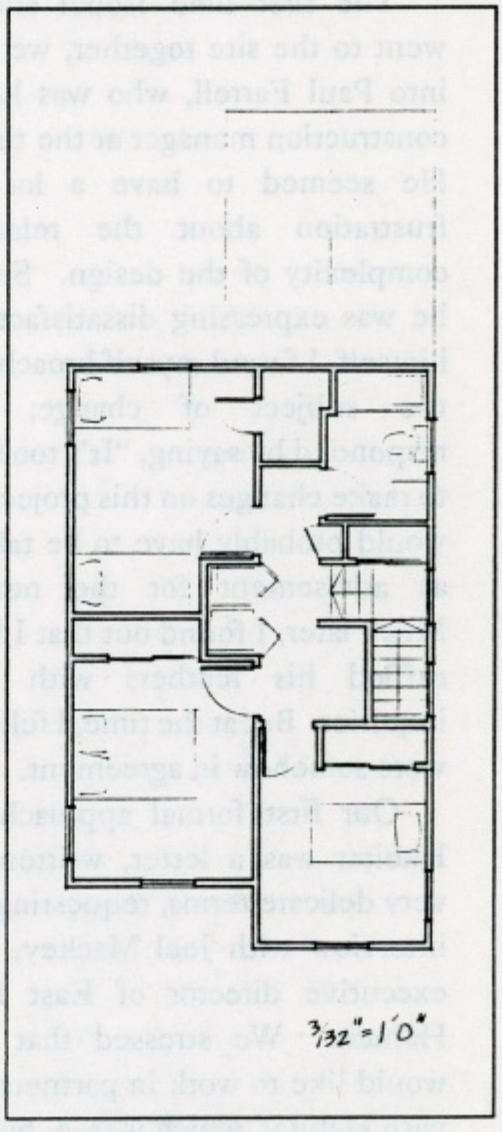
The answers to these doubts are embedded in Habitat's philosophy, and after absorbing a lot of material and conversations I began to believe more in the project. Habitat is a volunteer organization first of all, not private, so as long as we weren't too presumptuous they should appreciate our efforts. I saw that Habitat is already "different." They value things other than efficiency, though they'd sometimes have to deny this in order to keep going. Peter has told us that he feels we're doing

something he wishes he could have done, but just didn't have time.

Throughout the process, from the very beginning, we'd been testing the waters. Knowing that everything we said had to be carefully phrased and timed, knowing that there would be effects and somewhere down the line there might be problems if we weren't tactful. It was easier than it could have been because we were working within the system



Existing Street House plan (first floor)



Existing Street House plan (first floor)

and often, all that we were doing was bringing the process back to the original state wherever it had been pushed out of line. But we felt that the one thing which could have sunk the ship before we left the harbor, is if we had been tactless or obnoxious.

The first time Isobel and I went to the site together, we ran into Paul Farrell, who was head construction manager at the time. He seemed to have a lot of frustration about the relative complexity of the design. Since he was expressing dissatisfaction himself, I found myself broaching the subject of change; he responded by saying, "It's too late to make changes on this project, it would probably have to be taken as advisement for the next." Much later, I found out that I had ruffled his feathers with my inquiries. But at the time, I felt we were somehow in agreement.

Our first formal approach to Habitat was a letter, written in very delicate terms, requesting an interview with Joel Mackey, the executive director of East Bay Habitat. We stressed that we would like to work in partnership with Habitat, which is true, but at the time it felt slightly smarmy, because we didn't hint that we planned to make a proposal, but only said that we wanted to learn as much about the process as possible. Joel never tried to avoid us, and returned my phone calls from the beginning — a good sign! We interviewed him at length about the history of the 105th Avenue project.

We were then sort of at a standstill for a week or so, stuck. I didn't know what in the world to do next. Isobel and I talked some, all of it unproductive.

Then one day Chris called us into his office and asked how we were doing. Up until that point I had been still trying to get clear in my own mind even just what the goal was. But that day, he asked, "Are you not able to work together? Not getting along? If you can't work together, you'd better decide now. Now the test is this: you have to work fifteen hours in the next four days, and at the end of the week you're going to show me what you have."

So this really got us going. We started going every day to a cafe and hammering out our understanding of the existing process. I don't know why we thought we had to do it this way.

It was sometimes very exhilarating, often exhausting and frustrating. But we did feel more cohesive as a team, as though we were really working together on something worthwhile. We would buck each other up when we got depressed. At the end of the first week we only had the very most fundamental first steps down, nothing about the development of the design process itself, so we just kept working in that manner for the next two weeks. Finally we came up with a process we felt was pretty much complete up to construction.

We presented this process to the atelier in the middle of the semester. What we had come up with was unbelievably cumbersome. Some thirty-seven steps, many of them obscure. Presenting was a nightmare. I felt foggy-headed and unable to respond or even to remember why we'd decided certain things. We were proposing all sorts of alterations to present practice, some of which weren't even of importance to the end result; and most notably, all we were proposing in terms of design process was an elaborate, "centers"-focused series of charrettes.

This we presented to the atelier, and Chris was mystified by it. He said, "I just don't see that you've understood where the difficulties really lie. This all strikes me as wishy-washy and PC. And I hate the term *charrette.*"

A long discussion then erupted about the possibilities and limitations of a design process in which the architect would somehow absorb and integrate numerous design wishes into a very few designs. To Chris, this meant a blenderizing of very individual preferences, which could only produce mushy design.

I felt that I had been dishonest, or rather, that I had not listened to the voice that had been telling me that I was being false in agreeing to some of its components. I had told myself that the uncomfortable feeling was just something you had to live with in architecture, that all this "design" was unavoidable. It's not.

Four days after this disastrous presentation, Isobel and I got together to talk. We basically had come up with the same ideas, though I insisted on focusing on homeowner construction, having a

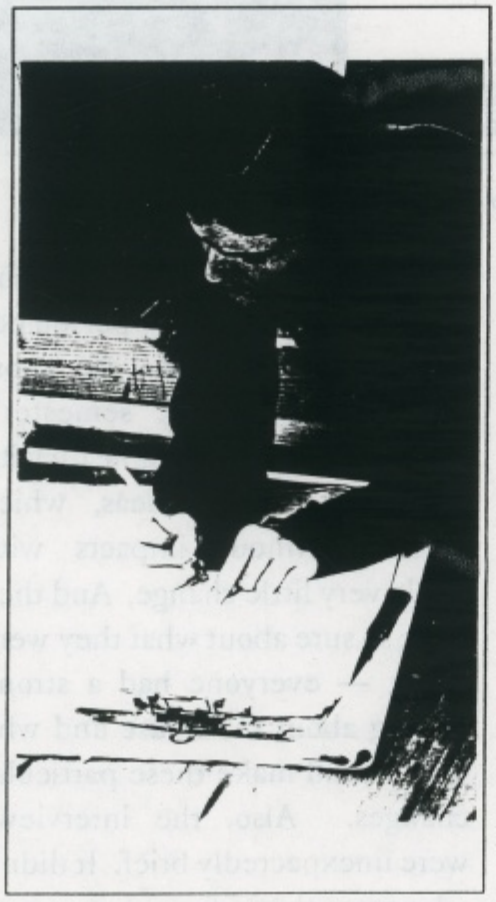
new and sudden conviction in my ideas. The main point, though, is that the reborn proposal is only five steps, all crucial and all supporting each other, none superfluous. It was a fascinating thing: weeks of tortuous haggling, then suddenly a bright clear insight which had the emotional quality of calm, sureness, simplicity and conviction. Since its rebirth, the development the process has been smoothly unfolding; we didn't hit any more snags, right through till the end, and I took this to reinforce my conviction.

This new process, as written in the beginning of the paper, has been somewhat altered since its conception. Originally, the emphasis was much more on designing during construction. We first thought that homeowners could begin making design decisions after the first floor deck had gone on, so that as the building was rising around them, they could be sure that their decisions had the results they were after. This mode of decision-making would have

Isobel making framing template

been especially crucial in the placement of windows and doors.

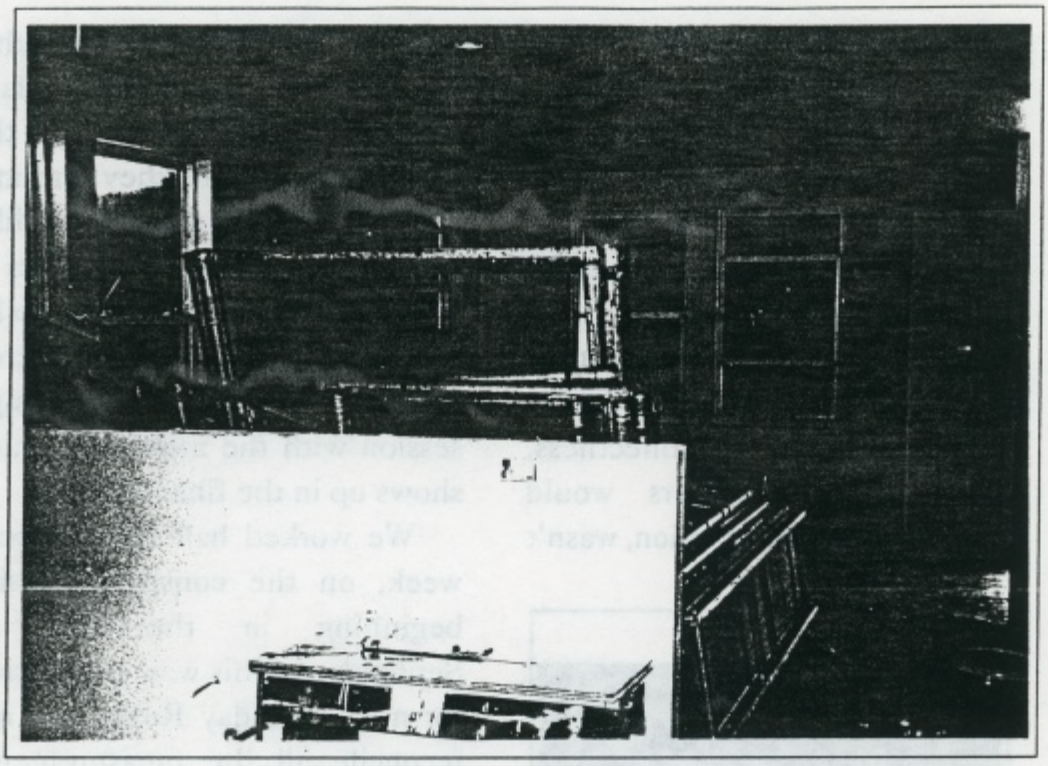
We showed this new, direct process to Peter and to Roger, now the primary construction manager. Both of them said basically, "We-e-e-ll, I don't see why this wouldn't work." Unfortunately, these discussions also forced us to accept that this level of directness, in which homeowners would design during construction, wasn't possible. Roger was adamant that all changes in the plumbing plans be fixed before laying down the first floor deck. And they certainly weren't willing to do anything like put up a wall and then cut holes in it for windows - that needed to be planned out too. So, we altered the process to include the design session with the architect, which shows up in the final process.



Bethany checking measurements

We worked half days, once a week, on the construction site beginning in the end of September. This was a revelation for me. One day Roger had me reconcile all the measurements (wall lengths) on the plan, as we were laying out the framing templates for the first floor walls, and I felt like I was a magic link between builder and architect, or rather, it felt like magic to see how the drawings and the real building exerted forces of change on each other. It certainly wasn't a one-way power flow, the way we're taught in school, where the architect has utter control Actually, Roger makes lots of decisions on site, just paying attention to the centers.

Eventually, Isobel and I realized we had to get an idea of what kinds of changes we might be

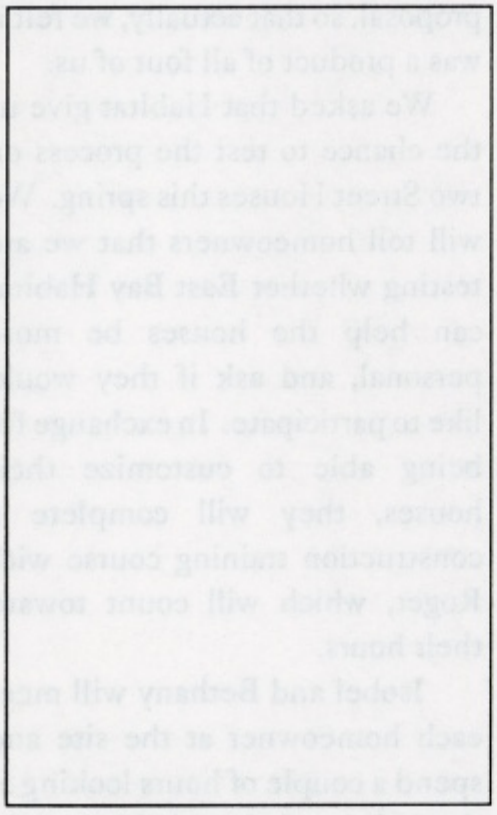


Living room of Street House

dealing with. We had no idea whether the proposals people would want to make would be modest or huge. We first made freehand, simplified plans at 3/16"=1'0" and passed them out to our classmates. We asked them to draw the changes they wanted. Chris immediately was concerned. He said, "No, no, you have to talk with them!" So we went around to other friends, some students and some not, and showed them the plans. We asked them to simply look at them and describe verbally what they would change if they and their family were living in the house, with at least one person per bedroom. This was the most exciting part of the semester's work for me. People came up with beautiful, simple, ideas, which made enormous impacts with really very little change. And they were so sure about what they were doing — everyone had a strong feeling about the house and why they would make these particular changes. Also, the interviews were unexpectedly brief. It didn't take more than fifteen minutes to do the whole thing.

The elements of change can be sorted into ten categories: 1) porches, front and back 2) kitchen, dining room and living room layout 3) entries 4) landings 5) kitchen layout 6) moving and adding doors 7) moving and adding windows 8) walls and half-walls 9) closets 10) toilets 11) moving washer and dryer.

Again, only two suggests of about twenty were not feasible in terms of construction, or Roger's willingness to build: moving bathrooms from one side of the house to the other, and making ceiling and floor level changes.



One of the original sketches

We put together a catalogue of finite elements (room layout, windows, porches, etc.) and all the suggested variations. We then analyzed them in terms of cost and labor so that we could back our propositions with hard data. On November 4, we showed our sketches of proposed changes to Roger. He liked them very much, and was surprised at the number and quality of them.. His criticisms weren't terrible, either; he had some realistic concerns about construction but didn't think the costs of the changes would be high. He made it clear that certain decisions, especially about plumbing, had to be made before the first floor deck was laid. We asked him what the building committee would want to know when we made the proposal to them, and I was very surprised by the answer. He said, tell them "why are you doing this, who wants these changes, and why do they want them." This was a far more philosophical approach than we had anticipated, and encouraged us to stick with our emphasis on the covenant.

We then showed the drawings to Peter on November 13, just to make sure we weren't overlooking anything. First, he said, try to conserve energy by settling on changes in one meeting. He thought the minimum time it would take to work out each house was four hours: two with the homeowners, two drawing it up. Peter's pretty sure the Building Department wouldn't find changes like these much of a bother, and wouldn't require re-permitting. In a few cases, perhaps the engineer would need to recheck the drawings, but so far we haven't seen any suggestions which would require this.

Peter expressed concern that a few families would get special attention, and then we would move on. It became clear that our commitment to testing this process ourselves next semester was required. Isobel was already hoping to do this, but I wasn't planning on it; now I think I will take independent study to work on it. He said, if we make it clear that this is an experiment, and if a couple of homeowners are willing to put in the time, we could probably put it to the test. He actually offered to put us in touch with homeowners. He made it *clear that the project is not worth doing if we slow construction or increase cost.*.

On Saturday, November 26, we made a presentation to the Building Committee: Peter Waller, Roger Rushing, and Leonard Nielson, the general contractor. We had produced a document with a statement of purpose, hardline drawings, and rough cost analyses. We had incorporated many of Peter and Roger's ideas into the following proposal, so that actually, we felt it was a product of all four of us.

We asked that Habitat give us the chance to test the process on two Street Houses this spring. We will tell homeowners that we are testing whether East Bay Habitat can help the houses be more personal, and ask if they would like to participate. In exchange for being able to customize their houses, they will complete a construction training course with Roger, which will count toward their hours.

Isobel and Bethany will meet each homeowner at the site and spend a couple of hours looking at the plans and existing street houses, and talking about

possibilities and limitations. We will also discuss house color, carpet and vinyl choices, and fences. We will have a simplified plan on which we will note down ideas, in writing and drawing. After the initial session, only small changes can be made during construction.

We will then take this information, draw it up, dimension it, staple a copy of the revised plan over the original construction set, and submit a copy to the Building Department if necessary. We will work with the Building Committee to figure out the budget for the changes. If there is no way to cover the cost of the changes by adjusting the budget, it is the homeowner's responsibility to pay for them.

The final stage will be construction of the houses with changes. The homeowners will specifically participate in building the items of change, so that they can evaluate and improve them during construction.

If this process is successful in the testing phase, we hope that Habitat will consider adopting it permanently.

All of this was in the document we gave each of them, and they quickly read through it as Isobel made a very short introduction. We were amazed to see that it only took about two minutes before the three of them were discussing it mostly among themselves, and *actually defending it to each other!* The issue of permits was laid to rest by Leonard, who explained that since the Building Department requires a new set of drawings for each house in the development, as far as the city is concerned, each one could be different. And even if you submit changes later, there's no change in cost. I began to feel happy and lightheaded as I realized that the proposal was probably going to go through.

Leonard brought up the important issue of the sustainability of the process. Peter expressed concerns that a couple of families would get special treatment and the rest not; but then Roger said, "That's the Habitat way. Everybody gets their needs met, but in different ways." Leonard had suggestions for setting up the project through the CED so that future students could hook into it. We discussed Habitat's tradition of volunteers training their own replacements. Peter even said that if he had a

handbook that documented our testing of the project he'd more likely to be able to keep it going. Isobel and I looked at each other — I couldn't believe they were already thinking so far ahead! Later she said that they had begun to use us to accomplish their own goals. I think they had been testing us, to see how committed we were to the project — now they see us simply as Habitat volunteers, no longer just as students.

Leonard asked Peter how this process is qualitatively different from what he does now, and we got a little scared. But Peter said that though he's tried to allow homeowners to make design decisions, what they have now is a short list of either-or choices. I think that if we were to give the homeowners a catalogue, it wouldn't be different that what Peter is doing; but we are doing something different when we ask them to imagine their own houses.

The most amazing thing was that the extra materials costs, which we expected to be grilled about, was absolutely not an issue because they already have a $1000 discretionary fund. It became clear that all three of them assumed from the beginning that this is where the money would come from. Whereas I had always thought that we would have to juggle the budget ourselves.

They had questions about our timing for next semester. Homeowners should be completing their 100 hours about March 1, and then we can get into the design and building. Until then we can work on organizing the new homeowner selection process and construction training sessions.

At one point, Leonard said that the final yes to this project lies with Roger, because it really changes the nature of his job — but we already knew that Roger was willing to do it! We were quite surprised that the three of them could OK this on their own, without having board approval. But Isobel pointed out that Habitat works the way centers work, each person strengthening the others. There is an abstract hierarchy, but not a rigid, life-sucking one.

Leonard said that he agreed completely with our philosophy. As we were leaving Peter thanked us, and told us that it's energy like ours that keeps Habitat going.

East Bay Habitat really doesn't want to build tract houses.

At the end of the semester now, I realize that I did not go through this project with a vision of beauty, of what the site could be. I believe that I was holding myself back, afraid to believe that it can be beautiful. Now I want to unite myself with the process. It would be beautiful, precious to me, to see this process made real in just one house.

Conclusion

The empirical results prove that *given a simple framework, people are sensible about making changes.* People suggested changes that were meaningful, yet were neither prohibitively elaborate or inconsequential.

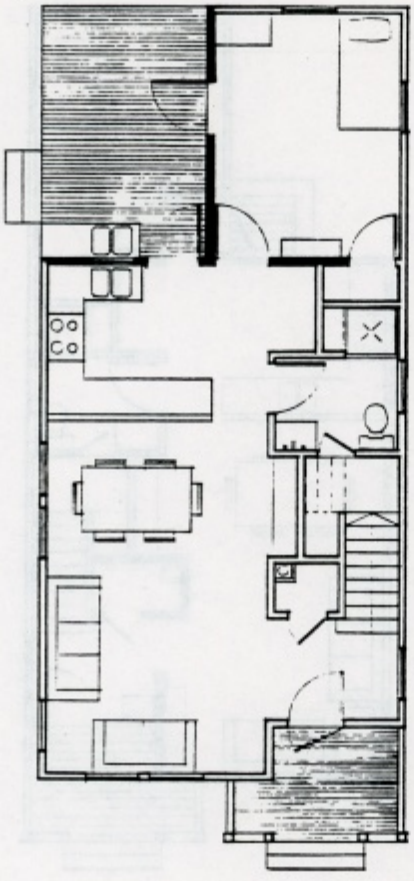
As Chris told me, this kind of experiment has never before been done. It implies that something which for years has been assumed to be impossible, the true personalization of housing developments, is possible, because of the nature of the things people really want.

This is the value of this investigation to builders, architects, developers. Each homeowner now has the power to make changes or not to the established design, big or small, and to build them himself. The significance of the process, and I think the reason it was accepted so readily, is in its directness. *This process may get the results that endless community meetings and charrettes never will.* Our process definitely has the potential for making real life arise in the site.

But how can I show or prove that this approach will "produce a bit of the environment to which people feel more deeply related, and feel that it is owned by them in both a real and emotional sense?" When these houses begin to be built, it will be clear whether they are giving something back. This has not been a part of this semester's work; instead, the question has been, how can we make this groundwork as significant as possible?

The thing which told me that it's all right is this: *all we are doing is helping Habitat to stick to its covenant.* This was our original idea, the first time we got together to analyze the problem. We saw that a deathly result had somehow come out of a beautiful philosophy, and thought the thing to do would be to intensify

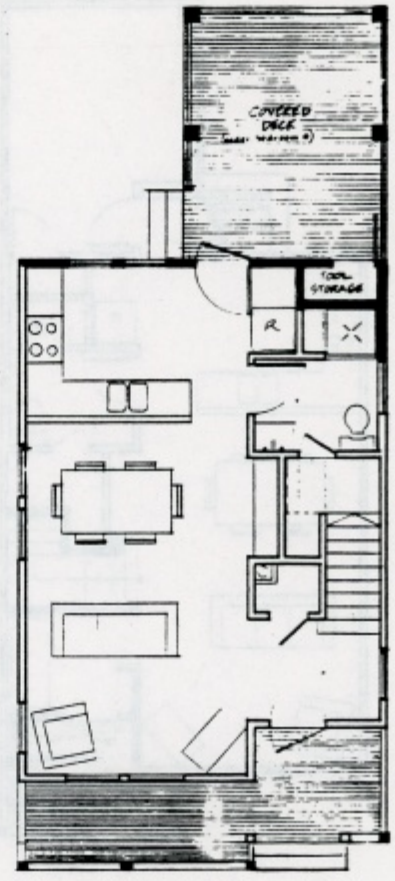
Habitat's commitment to its ideals. In other words, we are intensifying the centers which exist within the organization. Much of the work I've done in the atelier relates to my increasingly layered understanding of *The Nature of Order*, which I understand not an architectural theory, but a theory of art, people, nature, the spirit, life. This work is leading me to an authentic way of making things, which is all I've ever cared about. *I had a greater sense of accomplishment after Habitat approved our proposal than I have ever had in my life.*



#1
PORCHES

Deck: $510
Sink: $200
Exterior door: $575

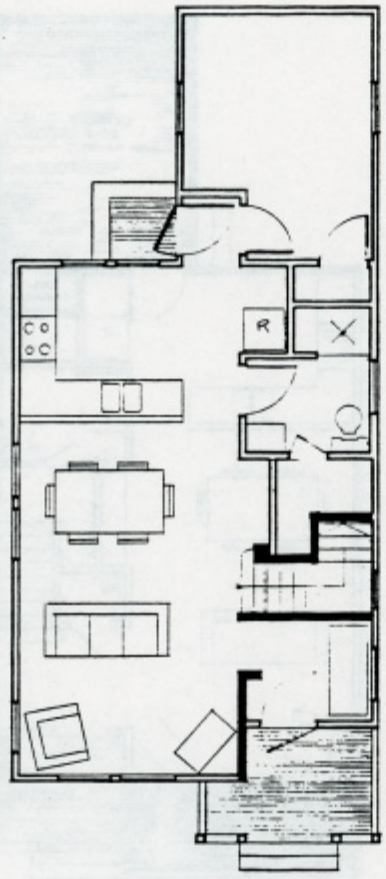
Total: $1285



#2
PORCHES

Front porch: $200
Back porch: $510

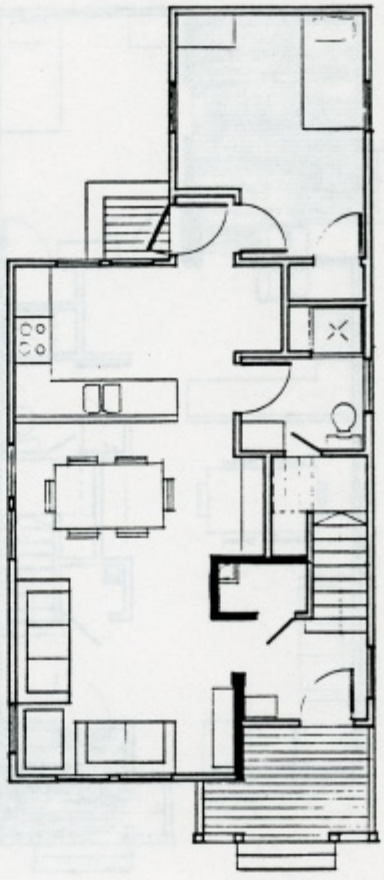
Total: $710



#3
ENTRIES

Walls: $72
Remove closet door
Alter stair

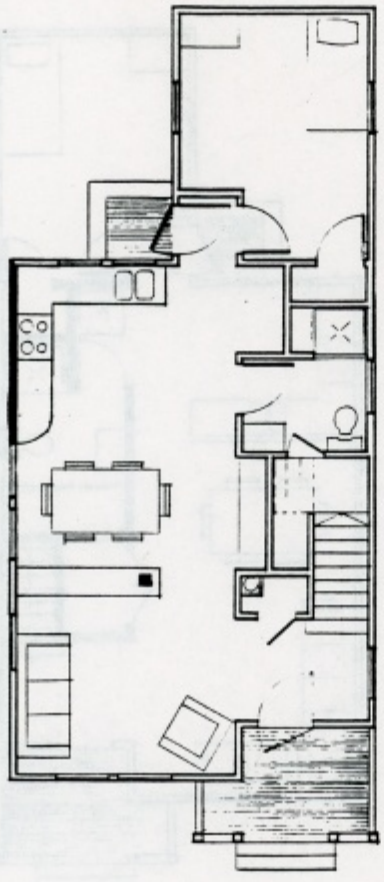
Total: $72



#4
ENTRIES

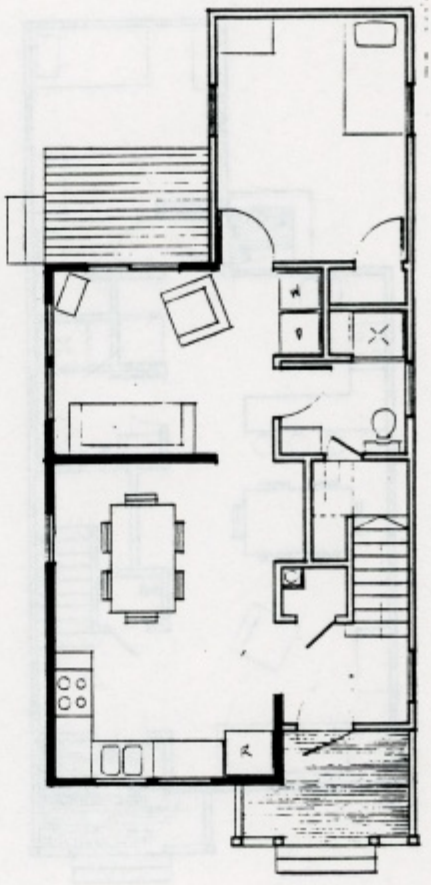
Walls: $58
Add column: $5
Move door

Total: $63



#5
PARTITIONS

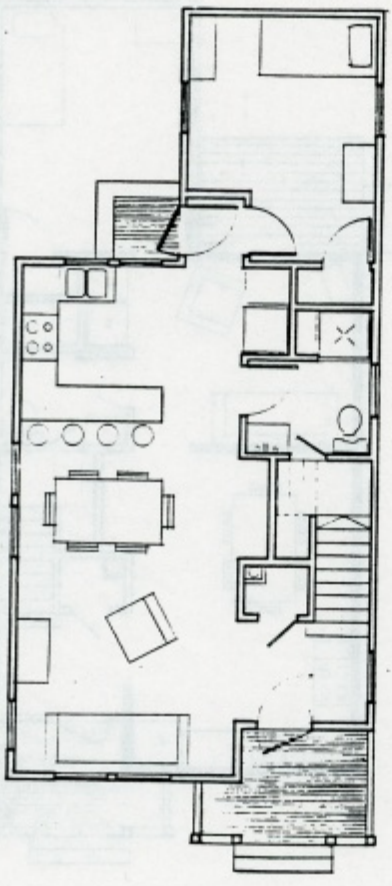
Bookshelf: $65



#6
KITCHEN/LIVING ROOM LAYOUT

Change location of kitchen and living room
Replace exterior door with sliding glass door
Remove wall: -$30
Enlarge back porch: $250

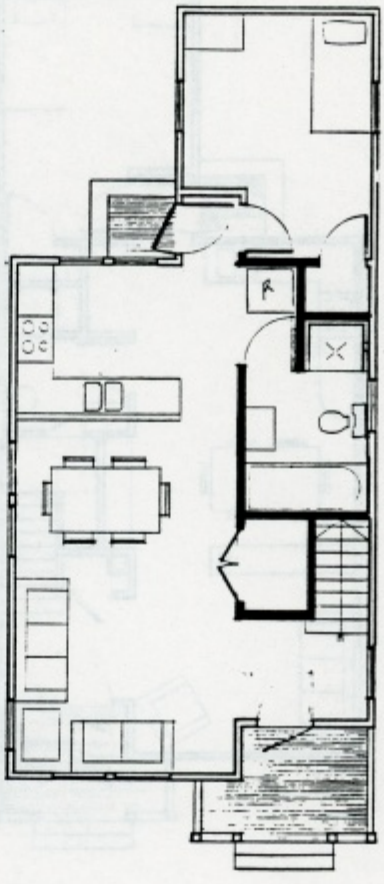
Total: $220



#7
KITCHEN LAYOUT

Remove half-wall
Add length to counter

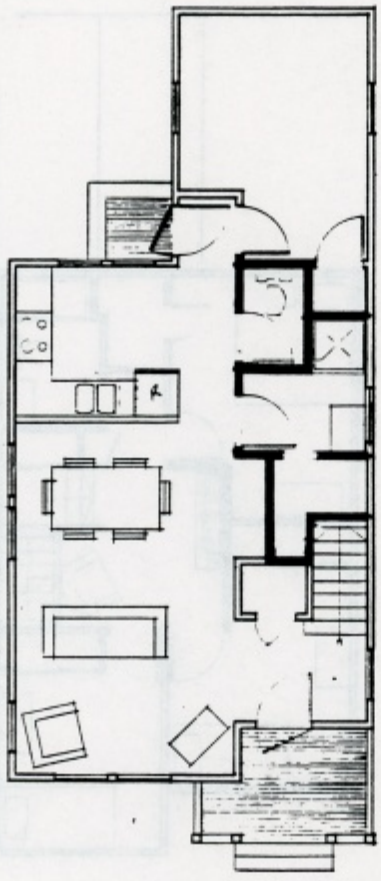
Total: $0



#8
CLOSET/TOILET

Move door
Replace single closet door with double door
Add bathtub: $200

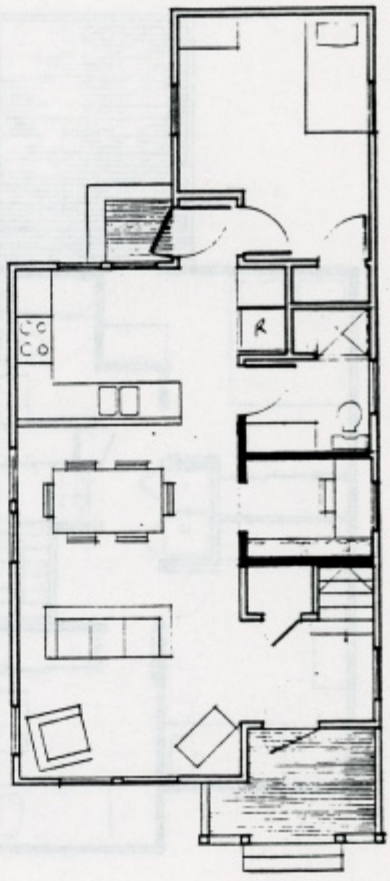
Total: $200



#9
TOILETS

Move door
Add door
Move toilet
Add walls

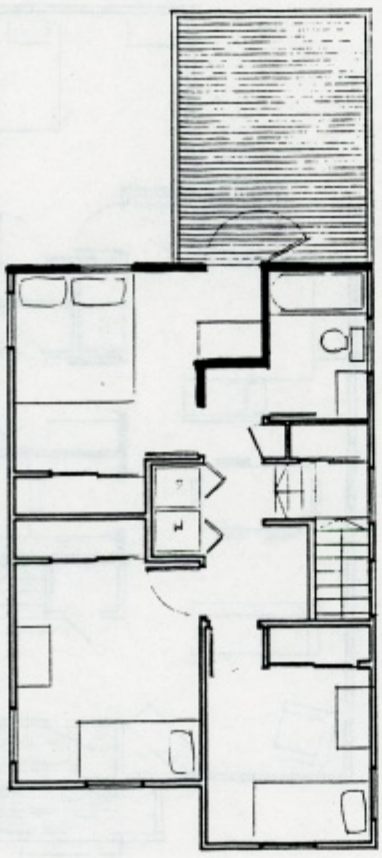
Total: $0



#10
ALCOVE/TOILET

Move wall
Add opening
Remove door: -$130
Add window: $100
Bigger lavatory: ~$65

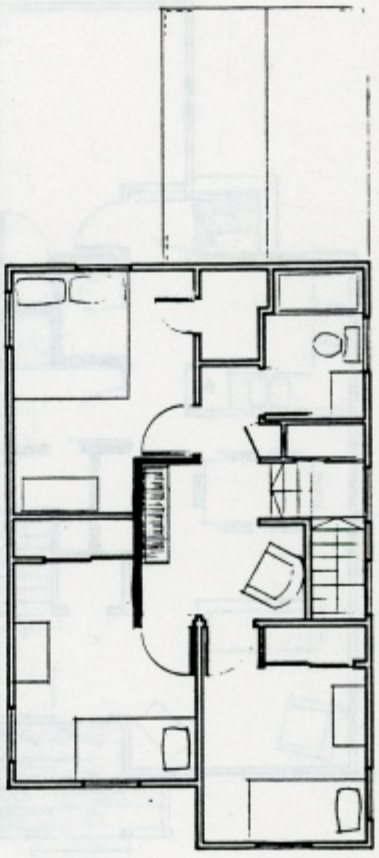
Total: $35



#11
REAR DECK

Move closet
Add exterior door: $575
Build deck: $1000

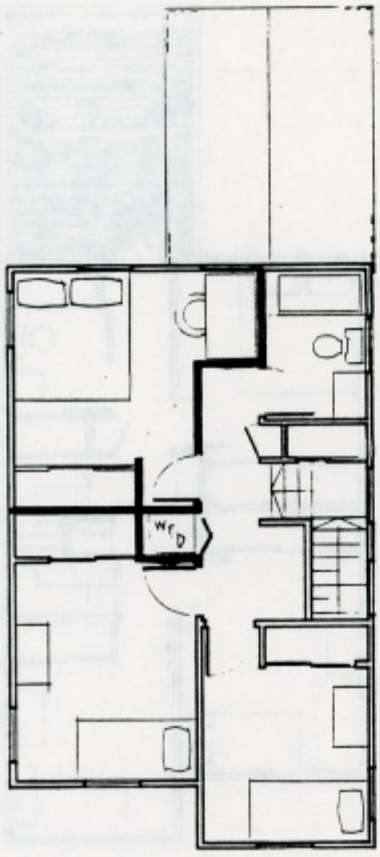
Total: $1575



#12
MOVE W&D

Move walls
Move door
Move W&D downstairs

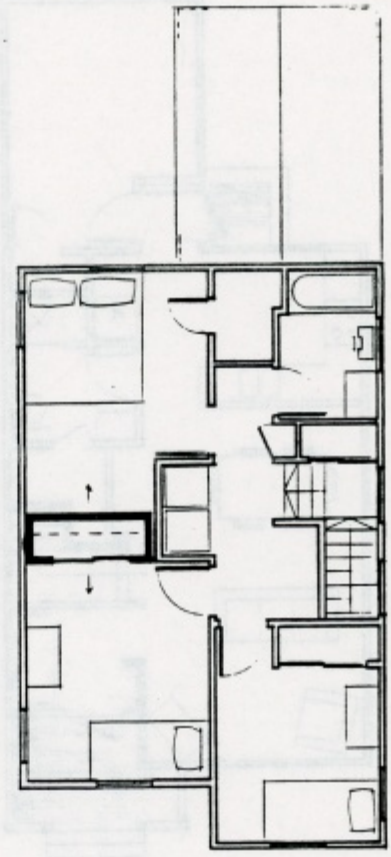
Total: $0



#13
WALLS/DOORS/W&D

Move closet
Stack W&D
Add window: $165

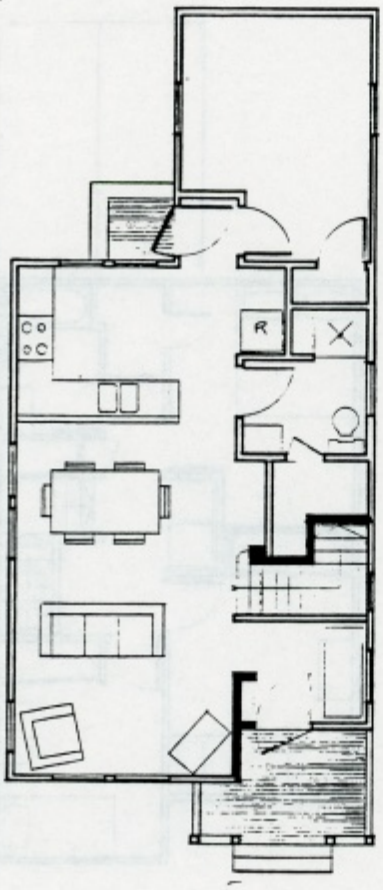
Total: $165



#14
MOVEABLE CLOSET

Tracks: $200

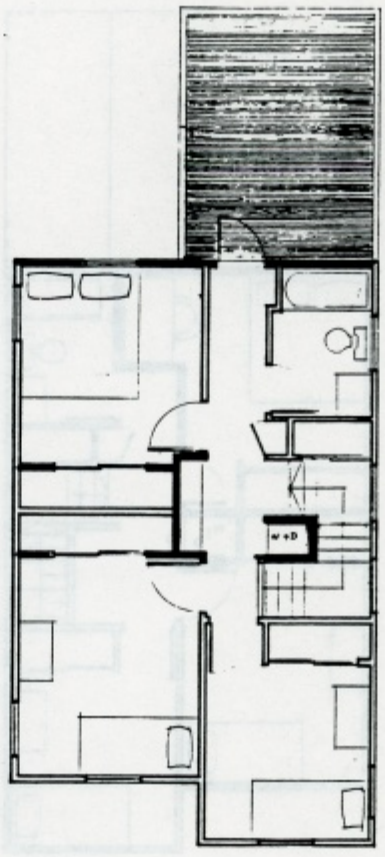
Total: $200



#15
DAVID'S HOUSE
(first floor)

Remove closet door
Alter stair
Walls $72

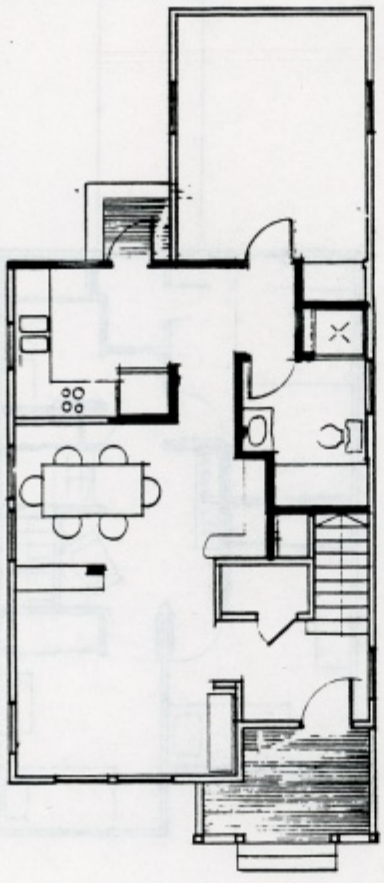
Total: $72



#16
DAVID'S HOUSE
(second floor)

Stack W&D
Move closet
Walls $58
Add exterior door $575
Build deck: $1000

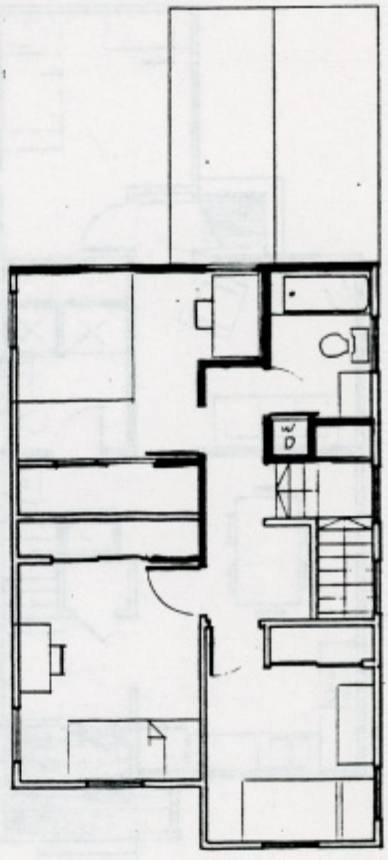
Total: $1633



#17
DANNA'S HOUSE
(first floor)

Move exterior door
Move interior doors
Add bath tub: $200
Add walls: $110

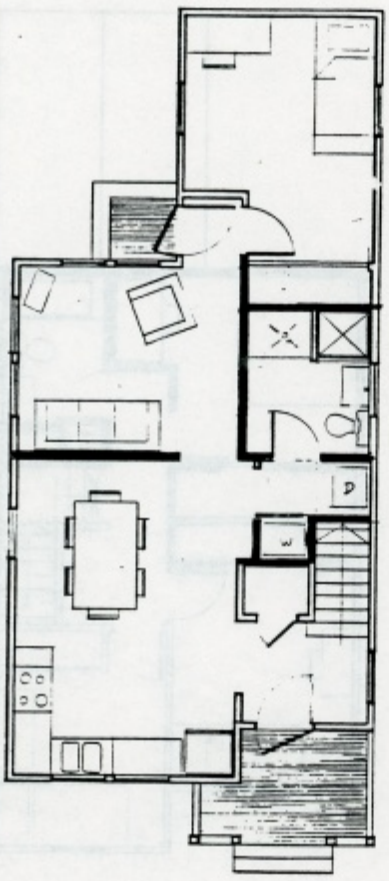
Total:
$310



#18
DANNAS'S HOUSE
(second floor)

Move W&D
Add window: $165

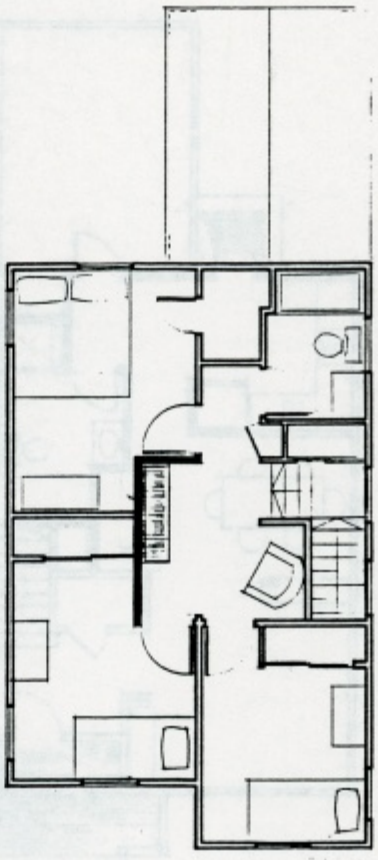
Total: $165



#19
NOGAH'S HOUSE
(first floor)

Move doors
Move windows
Move walls
Switch living room and kitchen

Total: $0



#20
NOGAH'S HOUSE
(second floor)

Move W&D
Move door and walls

Total: $0

Listening
A Building Process for East Bay Habitat for Humanity Oakland 105th St.

Isobel Damelin

In the following humble paper, Damelin describes her experiences in dealing with the organizers and residents of Habitat: a low cost housing project. The emphasis on listening is very good. It would, also be extremely helpful, if we could understand how the process of listening more carefully, might be embodied in a new process. One this level the humble approach is extremely attractive.

And, once again, as in the previous paper, we have insight into the remarkably simple, but in my view revolutionary, discovery that when families are asked to make changes in a standard house, the changes which they make fall just nicely between the too-modest, and the too-crazy, thus giving enormous personalization, while yet keeping cost and complication to a minimum.

It could so easily have happened that families make unreasonable and immoderate choices, which make the design and management task impossible; or it might also have happened that families are too modest, and make only minor changes which do not make the houses truly personal to them. The modest and moderate choices they make to get their individuality is fascinating, and of enormous power. I believe this may be — for a certain kind of housing — the wave of the future.

I started this semester wanting to learn how to become a better listener.

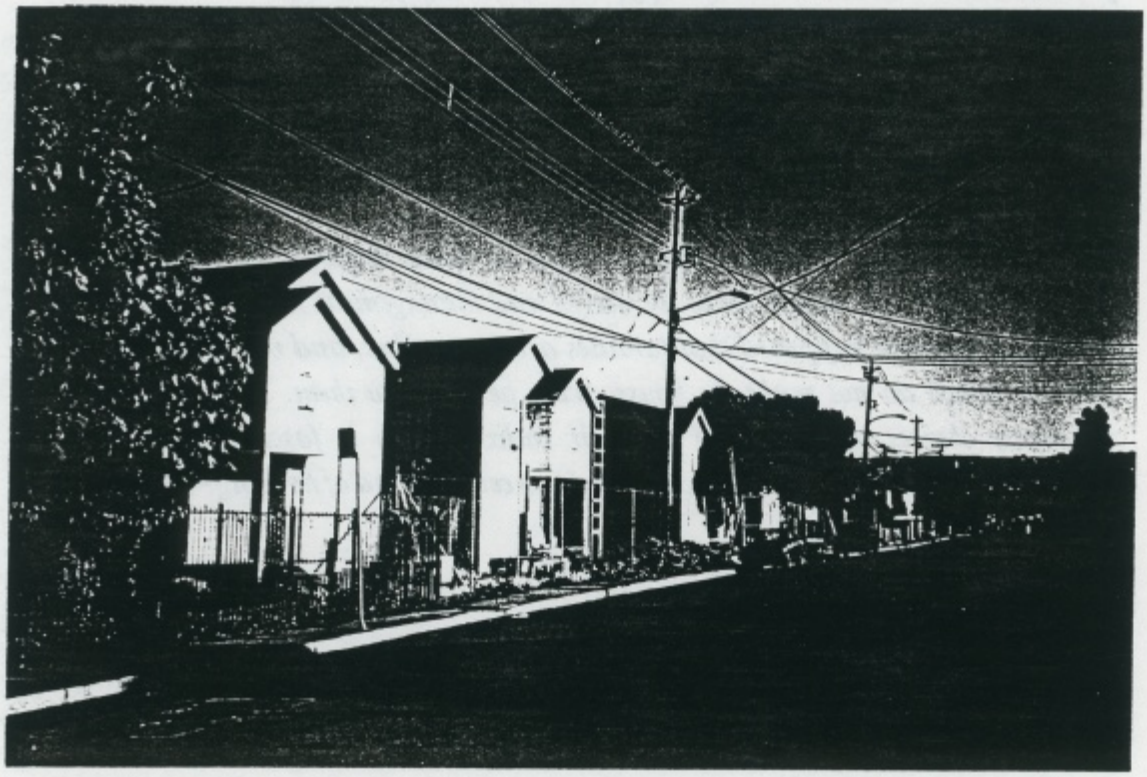
I felt that the ability to listen was an important tool in a profession that dealt with human relations. I thought that my summer experience in helping a friend build a house had caved in because of a lack of communication skills. To me "listening" means being able to recognize difficulties when they surface and address them without maiming either party involved or harming the project.

It calls for courage and integrity.

Introduction

I had joined Bethany Opalach in working on the Habitat For Humanity project.

She spoke of finding a way to personalize these houses and redeem them from their tract housing appearance. Looking at photos of the site, the houses seemed surprisingly decent which gave me an optimistic feeling, we



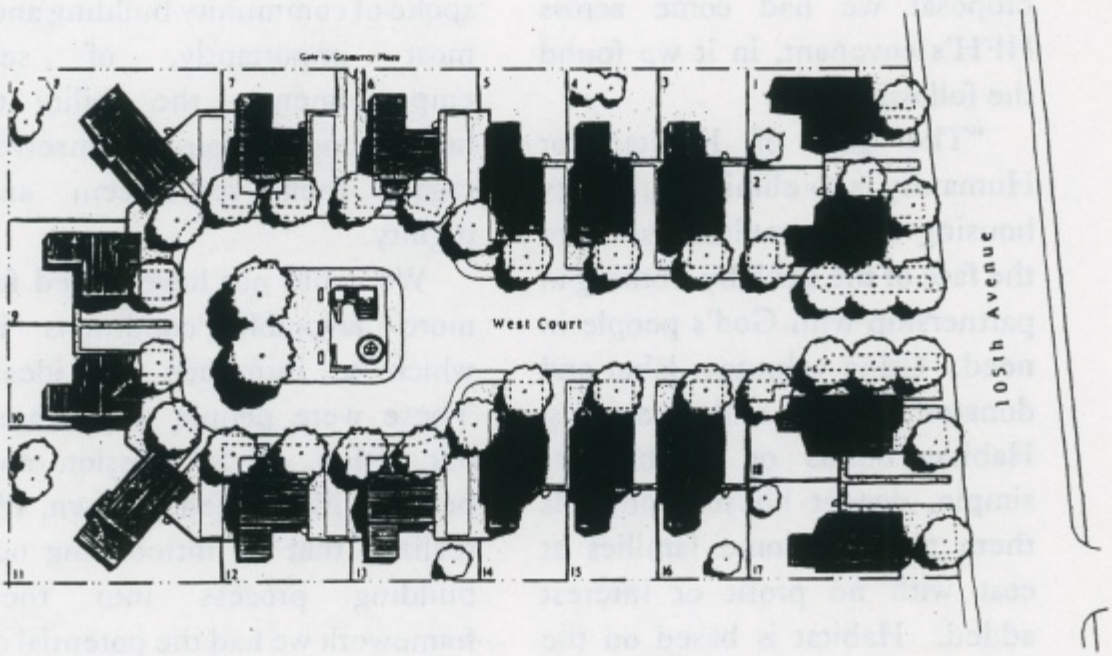
View from 105th Street

wouldn't be starting from rock bottom, their qualities were a solid basis to build upon.

That same week we drove to see the site together.

Located on 105th St. in Oakland and managed by Habitat For Humanity's East Bay affiliate, this project of 40 two-story detached houses is divided into two lots, one on either side of the street. EBH's projected goal is to finish building ten homes by the end of 1994. Four have been completed, four are in progress and two have yet to materialize. This is by far their largest project, previous ones were eight two-story duplex units in Richmond and two home renovation jobs.

These were without a shadow of a doubt very handsome houses, well made, not at all what you would expect for tract housing projects. They had nice proportions, great pitched roofs, and showed structural integrity in exterior elements such as porches, gables, windows, stairs, etc.



Site plan

Nevertheless, there was an overbearing sadness to them, a dull sameness in their lack of animation and distinction from each other. They reminded me of army barracks. I knew it wasn't their unfinished phase of construction that accounted for it. The houses were placed at even distances from each other, in a regimented way that didn't create positive spaces between them. At the far end of the site a mound of earth was left for a roundabout / future playground that looked ridiculous.

While working on our project proposal we had come across HFH's covenant, in it we found the following:

"The goal of Habitat for Humanity is to eliminate poverty housing and homelessness from the face of the earth by working in partnership with God's people in need. Using volunteer labor and donated funds and materials, Habitat builds or rehabilitates simple, decent houses and sells them to low-income families at cost with no profit or interest added. Habitat is based on the conviction that Christian discipleship must be lived out in practical ways which help to lift burdens from the shoulders of others." —From *A Basic Covenant Between Habitat for Humanity International and an Approved Affiliate Project, How to Start a Habitat for Humanity Affiliate.* p. 16.

It was clear we had found a group of people who were addressing a significant social problem and were determined to make a difference in their community. Based on a vision of partnership they wished to create an environment of hope, dignity and truly humane existence.

They were interested in much more than building shelters. They spoke of community building and, most importantly, of self empowerment— the ability to help people help themselves regain their self-esteem and dignity.

We could not have hoped for more favorable conditions in which to introduce our ideas. These were people who shared our vision, whose passion and belief in life echoed our own. We realized that by introducing our building process into their framework we had the potential of solving a much larger social problem, which added a

Houses along the main Inner Street

meaningful dimension to our work.

Last but not least, since HFH is based on self-motivated good will and voluntary work not profit making, where the emphasis is put on human benefits rather than financial ones we felt that they, more so than any other developer, would be receptive to our unconventional "Building Process" methods of design and construction.

In effect what we were looking for was the vehicle that would enable families to gain a sense of ownership of their houses, not merely in monetary terms but in a way that would form a bond of identity between home and owner, thus creating a sense of belonging in an emotional way. We realized that we were rocking the boat by introducing a new element to be reckoned with - personalized homes. What would take to achieve this we didn't quite know, but we felt it would be a direct outcome of the process by which the houses materialized.

I want to take a moment to describe the state of mind we were in.

Sensing we were sitting on one of the most interesting projects we had ever encountered, there was

both excitement and great anxiety. The scope of this "thing" was so huge and overwhelming, the sheer complexity of it almost paralyzed us. We didn't know where to start.

"Keeping your eye on the ball" is one of the most difficult things to do while working on a process such as this. The difficult thing is staying in focus of your basic question. Bearing in mind we had not yet seen the plans or spoken in length to any of Habitat's people we set out to draft our project proposal. In response to our impressions from the site we identified nine physical features that we felt needed to be addressed;

- 1. Positive space on site. The areas around the houses seemed to us like leftover spaces rather than places in their own right created with/by the built mass.
- 2. Well-defined private and shared spaces
- 3. Sense of place in positioning the units (entrance, edge, core, north-south). Placement of

Back Yards: with no positive space

houses seemed not to take into consideration their location on site or orientation to the sun. Entrances on the main street were relating to the street in the same manner as did those on the secondary one. It was disorienting.

- 4. Variation of house types. At that time, I don't think we were aware that there were different types altogether.
- 5. Variation within a house type (number of bedrooms).
- 6. Construction integrity. This was more of a reaction to what we had seen at the Richmond site, where porches and cantilevered overhangs seemed like they were glued on rather than built in. It made them look false and lose their integrity.
- 7. Homeowners' individual expression in house layout. Allow for individual changes to be made to the plans.
- 8. Personalized features (add-ons). Variations to porch enclosures, trim, choice of color etc. could make a big difference.
- 9. Better articulation using materials at hand. I feel the nine features were a step in the right direction, but more of an outcome of what the site looked like and how it could be improved on, rather than what are the steps that would bring about the changes we were looking for in people's ties with their personal environment.

It was clear we had to educate ourselves as to how Habitat operates and thinks, learn their ways and find out how to fit in. So we wrote a letter introducing ourselves, expressing interest in their work giving them a brief idea of what we were after. Desperately needing a foot hold, a means to show our sincerity and good will, we offered to volunteer once a week on site and help in construction. In hind sight I believe this was an astute move on our part. We picked up on building methods, construction skills and opened the way for dialogue and experimentation.

Stage One

Armed with our project proposal in one hand and HFH's covenant in the other we set out on a lengthy journey writing the new process. This stage took three weeks and consisted of two components: we conducted a

The Roundabout: dead space

series of interviews with key members of EBH, they were: EBH's manager Joel Mackey, project architect Peter Waller, assistant construction manager Roger Rushings and members of the Family Selection Committee (FSC) then, step by step, debated among ourselves over the stages that would bring about change. This incremental process felt very much like piecing together a puzzle, only without the cover picture.

These interviews gave us tremendous insight into EBH's methods of operation.

They opened our eyes to the on going discussions that were taking place within the organization. We were encouraged by it, because it was an indication of open-mindedness towards dialogue - the key element for change. Most of all we admired their drive and strength of will. These were very special people who possessed the unique quality to listen.

What struck me as unusual was the fact that for Habitat listening was a way of life, both as a tool of operation and a discipline.

▪ Listening as a tool.

They had realized that people have different sets of values and that they participate in these projects for different reasons. Families are interested in getting a house, not building a community, while volunteers are more interested in the houses than in the homeowners. Class differences are also a factor in shaping people's priorities. In any rate, the hope is that volunteers will feel they can bring positive change in their community, and that HOs by putting in their share of sweat equity hours will, as Joel phrased it, "be given the opportunity to dream new possibilities about themselves".

Keen awareness is expressed in their ethics of fund raising: It is extremely important that Habitat keep in touch with its community, which is why they are prohibited from using government funds for anything but acquisitions and infrastructure, (and now administrative costs), forcing them to turn to the community for help and insure they remain a grass-root organization.

Developing their listening skills is a constant learning experience, it has made them considerably more selective when choosing a neighborhood for their future families, so that they might have a better chance of adjusting to, and living in.

It has made them more attentive to homeowner's wishes, which would count for the single-family houses that are being built. Even though the architect wanted to design multi-unit houses, what they ended up building were single-family houses, because that was what the HOs wanted; the all American dream come true.

Habitat has learnt the importance of involving people in matters that concern their community. Inviting the community to take part in the establishment of their own neighborhood was crucial for the success of the project. It was important to realize that residents had a wealth of knowledge to share with the new-comers. Involving them in the process brought the two parties together and gave the HOs an opportunity to be welcomed into the community. It worked to the benefit of both parties.

▫ Listening as a discipline.

East Bay Habitat is aware of the need to communicate well. Developing those skills in their homeowners is one of their goals. They even went as far as putting on a seminar on conflict management for the families, creating a forum for them to address their problems. In effect saying; this is part of how we relate to each other of how we become a community.

Among themselves discussion is a means of improvement. For some time now EBH has been debating over issues of time conservation verses quality houses. Peter (the architect) was in favor of 60 roofs because they looked better, while Paul (the construction manager) was pushing for 30 angles that are faster and easier to build. Redwood window framing is more expensive than birch but lasts longer. The urge and the necessity to give HOs a quality product that will last longer and will save them from having to make repairs ten years from now weighs heavily with Habitat.

Perhaps the most striking part of it all is the way in which listening serves as a framework for their operations.

The organization is framed around a loose hierarchy of participants, most of which are here on a voluntary basis. Motivated by good will and firm moral beliefs, they have formed in groups creating pockets of responsibility, building upon each other's work striving towards one goal.

We now realized what an intricate network this was: initiating simple actions with the intent of seeing their impact reverberate far down the line of events.

- FSC - selects families - this will impact the social quality of the community.
- Architect - designs - will greatly affect the neighborhood physically.
- Construction manager - builds on site - empowering HOs in the future.
- EBH manager - runs affiliate on a daily basis - sets guide lines, frame of mind.

All of which made it very difficult for us to decide where to insert our proposed changes.

It was clear that by the virtue of their actions FSC and the architect

had enormous influence on the quality of life that would form in this future community, if so how could we best make use of it.

We were baffled by the sheer subtlety of EBH's actions. Issues of community, empowerment, human relations, dignity all seemed to comply with Habitat's covenant, yet were inexplicably contradicted by what we had seen on site, those didn't resonate in the physical outcome.

We couldn't understand why anyone would spend money demolishing buildings rather than enhancing them, their reasons for doing so didn't make sense to us. By that stage we had realized, much to our astonishment, that the designate HOs hadn't taken part in the design development of this project. We felt this was a breach of ethics which didn't coincide with what we had read in the covenant. How could HFH be talking about empowerment when eight houses were standing up and only two families had been assigned. Given all the good intentions in the world not much could be done without the HOs. We felt this was the crux of the matter; lack of HOs participation in the process of making their own homes.

We now felt a little more informed of what was going on. We were well into our daily routine of meeting up in cafés and over numerous cups of coffee, discussing all the twists and turns of our new process. I looked forward to those meetings.

This in itself was quite an elaborate process in the art of "listening"...

I felt that I worked best when I had the time to work things out for myself, in my mind, and then air them out in conversation with Bethany. We would do a little at a time, type it out and then have the rest of the day to think it over till our next meeting.

We worked well together, discussing one's thoughts always helps clarify things, though editing our ideas took allot out of us. It's really difficult to think together in front of a screen with only one keyboard between us—exchange of ideas ceases to flow and one party invariably gets frustrated.

I will try and condense the eight page proposal we had written into itemized ideas, so as to simplify matters.

The New Process

- 1.Funding. Keep finance structure as is.
- 2.Site Selection. a) Availability of land in a particular area: What is there to choose from? b) Project Feasibility: Based on total cost of parcel, how many units are necessary to make project cost-efficient and will existing zoning restrictions allow it. Those being the usual criteria we felt there was need for two more. c) Physical Potential of site: Does it have features that can be enhanced and built upon? What is its potential contribution to the neighborhood? d)Community's response: Does the community express interest in Habitat's proposal? Do they see it as a positive development and would they want to take part in it?
- 3.Homeowner Selection. HO's selection should be conducted concurrently with site selection and preliminary planning. Small projects of 1-14 houses should have all HOs selected before design process begins. Larger projects of 15-40 houses may have 50% selected by this stage. It is important that HOs be willing to participate in the design process.
- 4.Design Process. Money should be spent on enhancement, not destruction; existing trees should not be removed and existing structures be renovated and incorporated into the design. We proposed a series of design workshops guided by the architect, with the participation of HOs and community representatives. At each stage the architect would ask them to express their wishes and feelings, then collect their impressions and ideas and work out a design based on their input.
- 5. Approvals and Permits. Unchanged.
- 6. Construction. Training: First and foremost, train HOs in basic construction skills. Plans: Drawings will provide solid guidelines but won't be considered sacred-refinements and changes are encouraged. Budget: Fixed budget but flexible distribution will allow shifting of resources from one option to another (budget control is necessary.) Mockups:

Scheduled periods in construction sequence will be provided for it. Crucial decisions: To be identified and decided upon by architect & HO on site.

We presented our findings in class, only to be completely rebuked!

The argument being that design work-shops of this kind where a hocks, they pretended to give participants the illusion of freedom of expression and at the crucial moment the choice would be taken out of their hands and placed firmly with the architect under the guise of professional guidance, to be made into a meek approximation of their wishes. Lack of judgment on our part was severe, to the extent that no other consideration had any impact.

This was very bad indeed. The lose of time and waste of effort were minute when compared to the real calamity: Lack of .... listening ability. That was so humiliating, but most of all worrying.

I needed a break from all of this - so I went to shoot some pool. Bethany, I think, met up with a friend that weekend.

Stage two

We had worked together so intensely during those three weeks that we both needed some time alone. It felt like Atonement Day to me: Each wanting to reflect upon the key issue in a very truthful and personal way.

How could we give the families a sense of ownership and control over their surroundings in a way that would allow them to leave a personal mark, that will allow them to express their personal wishes...?

That will allow - that was the magic word. To relinquish control!

I was beginning to listen to my own words. It made so much sense- how can you expect the place to feel personally claimed if you don't allow for that to happen, if you don't give someone the opportunity to express themselves.

I realized two basic things;

A. There is no need to redesign the whole system, there definitely is room for improvement, but if we want to make changes in a realistic way we will have to work with what there is.

B. There are two aspects to this project, private and communal i.e. houses and site. Which of the two would be more affected by the personalization of space?

No doubt that changes to the houses would have the most impact on people's lives.

I begun thinking of the houses as a "renovation job". Families would be given a choice of four types to choose from, that then could be modified. Each family would meet with the architect and make changes to the plans in order to suet their needs, all within the parameters of the basic house cost. Exceeding costs would have to be paid for in additional sweat equity hours or traded off other expenses. Since each house is issued a separate permit this would not impose any new restrictions on the existing process.

By the same token, I very much liked the site design method we had devised as a "custom design" process, therefor I was thinking of leaving it as we had previously proposed.

We met up after three days of reflection, I read Bethany's proposal and then handed her my own without saying a word and just watched her... to our utter astonishment and much relief we had come up with the same proposal. This was a moment of triumph, we knew there and then that we were back in action!

We had just learnt our first lesson in listening.

This is how it was finally shaped.

Revised Process

- 1.Select homeowners while in the process of acquiring site.
- 2.Site design process consists of a series of workshops with neighbors, homeowners and architect. a) visits to site. b) graphic representation of centers within site. c) homeowners express where on the site they'd most like to live. d) neighbors contribute their knowledge of local problems
- 3.Architect designs three or four house types as before except *that the plans will clearly show what must not be altered during construction for structural or functional reasons.*
- 4. Habitat organizes construction training for homeowners before project construction begins.
- 5.During construction, homeowners decide and build for themselves anything

permitted by the plans: i.e., room sizes, window and door placement, porch design, landscape, ornamentation, color, fences. Homeowners will work out designs with architect, budget with construction manager.

It was clear there wasn't much we could do about homeowner selection and site design at this stage, since the project had advanced beyond that point, even though they were terribly important to the success of the process - we needed to concentrate on the issues we had influence on.

Nevertheless we wanted to put our point through: homeowner participation is of the utmost importance, without it there is no process. Involvement will allow families to make decisions about their lives and insure that the houses contain personal variation, therefore selection should start as soon as possible.

To insure this we went as far as to suggest that a pool of applicants be kept. Families who meet Habitat's requirements, could be assigned to projects as they arrived. Family selection would thus be made on a regular basis not necessarily for a specific project.

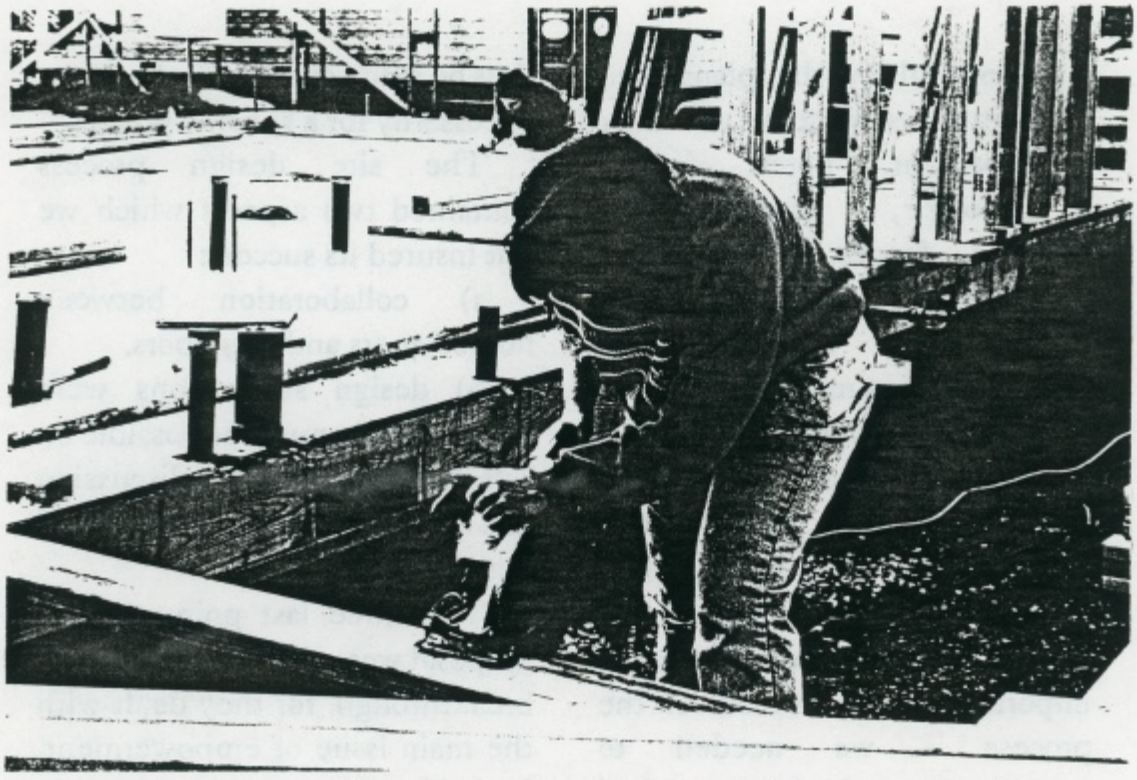
The site design process contained two aspects which we felt insured its success:

a) collaboration between homeowners and neighbors.

b) design suggestions were worked out as much as possible on site, during preliminary discussion and later on with models and stake outs.

The three last points of our proposal were where we made our breakthrough, for they dealt with the main issue of empowerment. It held an important place in Habitat's philosophy as well as in our understanding of the process.

I recall Peter telling us that in his view building the houses was much more important than designing them. At the time I disagreed with him, I now realize how true this is - where one can make the most tangible and immediate changes. Our months of working on site had paid off, we knew for a fact how simple it was to build a house: so quick and straight forward all you needed was a hammer, a tape measure and some wood and nails; Damn - even we could do it! That was when I realized that these weren't just



Volunteering on site: working on framing

words, that working on site really did have the ability to empower and that it felt great. I couldn't get over the ease in which Roger went about his work with volunteers, he had so much trust in people's ability and in the outcome of their work.

For our proposal to succeed we needed construction training to be organized, not this haphazard arrangement where homeowners ended up working in the office because they didn't feel skilled enough to work on site. The second thing was to devise the way of conveying what was/was not open to changes, it would have to be simple and easy to understand.

▫ Mutual Listening

It would seem that the emphasis had shifted in our minds from it being a design oriented process (project) to a build oriented one. It is one thing knowing this in an academic way and much another realizing it based on experience. This was a big step forward.

Another shift was eminent; it was high time we faced EBH and told them fairly and squarely what was it we were after. It could not be put off any longer, we had

reached the stage where the process could not advance without mutual consent and collaboration, we just had to be courageous about it and plunge into the real world - very carefully...

Bethany went over to Peter's house one night to pick up some plans and casually showed him our revised proposal. She said he just looked at it and said- "it's doable". I looked at her and felt very minute, we were working with a unique person. I felt so petty and insignificant recalling the ego trips we as designers are trained to have about our work and here was an architect who after investing all he had into these houses, was telling us he didn't have problems with us making changes to his work. Well I'll be damned!

Next we went knocking on Roger's door. He was the man who would have to deal with the implications of our proposal on a daily basis. As construction manager de-facto, much lay in his hands.

Roger fully supported our suggestion for construction training, he echoed our understanding of empowerment and said he had suggested the very same thing to the homeowners, sensing they had difficulty overcoming the emotional barrier of working on site, only they didn't seem capable of organizing themselves, as a group. It felt good to know that we were making sense, suggesting ideas that they themselves felt were necessary.

So we plunged ahead with our million dollar question: What would you need to see to be convinced of this idea? Roger's answer was; "I would want to see how this is benefiting the families, what are they gaining from it"?

My oh my... of all the answers in the world I would not have expected this one. This wasn't about money, schedules complicating his life, or any of those "prove to me that..." answers, this was straight from the heart - show me that you are making these people's lives better.

I realized I had allot to learn in life.

Testing The Process

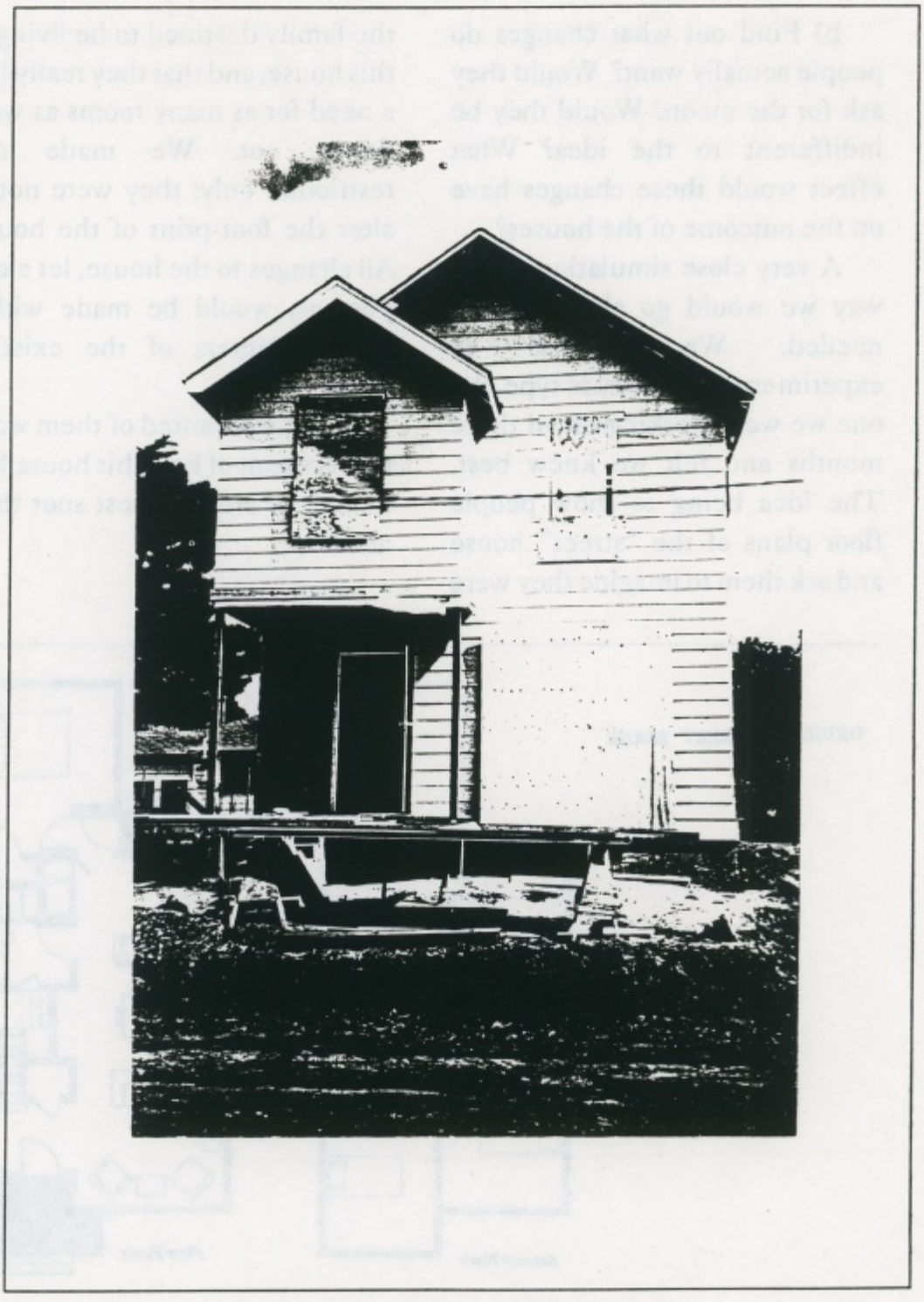
So this was it! Somehow it felt to us we were given a greenish light to proceed. No one had thrown a tantrum over our suggestions, even a measure of interest had been shown, they were definitely listening.

How then were we going to test our proposal when there weren't any families to talk to? This was the end of October and FSC hadn't selected their families yet. Not that it made much difference, we realized that unless EBH gave us the go ahead we couldn't approach families. From a moral point of view, it would not be fare to get them involved in something that then didn't materialize.

Since it wasn't a matter of simply working variations to the house, designing them ourselves was not the way to go about it. It was clear that our next step had to solve the two main issues of:

a) The actual testing of the process. We had to have a dry run of how we would go about executing our suggestions.

Street House: side elevation



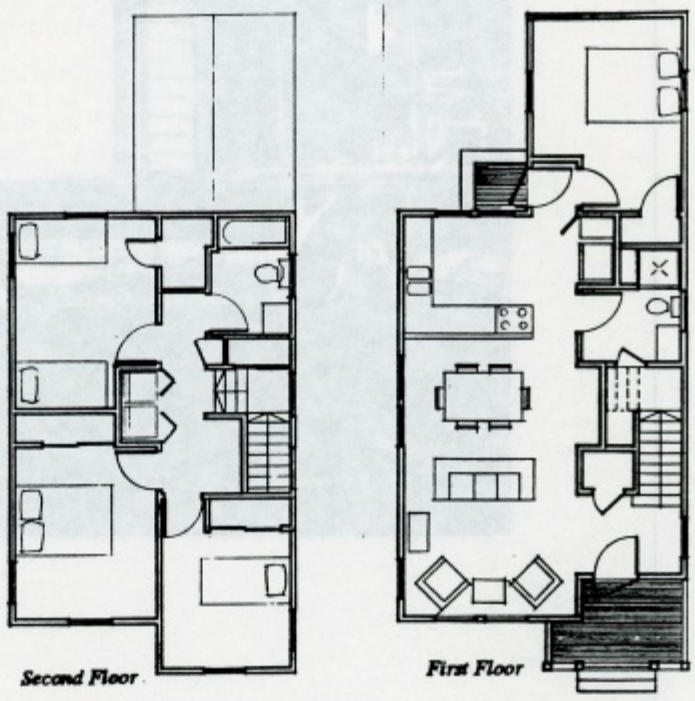
Street House: Front elevation (my favorite photo)

b) Find out what changes do people actually want? Would they ask for the moon? Would they be indifferent to the idea? What effect would these changes have on the outcome of the houses?

A very close simulation of the way we would go about it, was needed. We decided to experiment on one house type, the one we were working on all these months and felt we knew best. The idea being to show people floor plans of the "street" house and ask them to imagine they were the family destined to be living in this house, and that they really had a need for as many rooms as were drawn out. We made one restriction only: they were not to alter the foot-print of the house. All changes to the house, let alone porches, would be made within the perimeters of the existing shell.

What we wanted of them was a true account of how this house had to alter in order to best suet their needs.

ORIGINAL "STREET" HOUSE



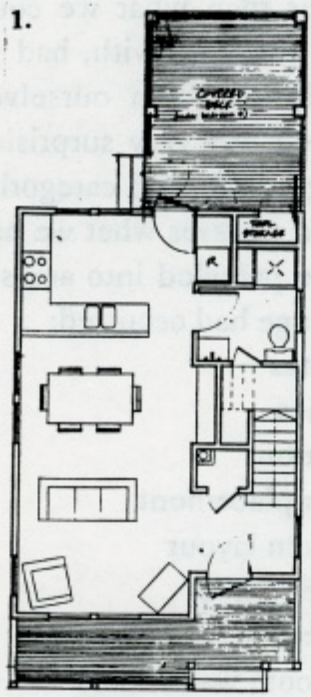
Admittedly at first we made the mistake of approaching friends at school and asking them to draw the changes they wanted, in effect asking them to design them. Chris put us on the straight and narrow real quick (Damn, staying in focus at every moment was so tricky)! Homeowners wouldn't necessarily feel comfortable drawing out their wishes, it might even prevent them from participating in the process. In any rate designing was a far way from changing to suet needs. So we turned to people from other professions, sat down with them and discussed their wishes. This made allot more sense and was allot of fun.

Back with our loot we immediately settled down to sorting out our gems. They were so lovely! They were so good! People had such beautiful ideas, much nicer than what we could have ever come up with, had we tried to design them ourselves- that in itself was very surprising. We arrange them into categories, this helped us asses what we had. They were parceled into areas in which change had occurred:

1.Porches
2.Entries
3.Partitions
4.Kt/Lr placement
5.Kitchen layout
6.Closet/Toilet
7.Toilets
8.Bedroom walls/doors
9.Rear deck
10.Landing
11.Move w & d

These are the alterations that resulted from our conversations.

1.



PORCHES

1. *Extra Door:* $ 575

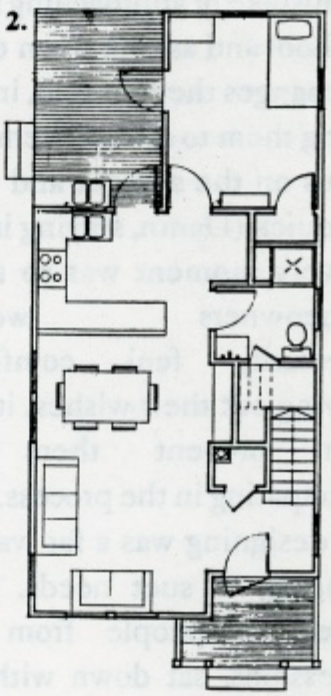
Deck:

Lumber	$ 165
Footings	$ 190
Columns	$ 18
Bolts	$ 35
Planks	$ 100
Totall:	**$ 1083**

2. *Front Porch:*

Total:	**$ 200**
Back Porch:	$ 510
Sink:	-$ 70
Total:	**$ 580**

2.



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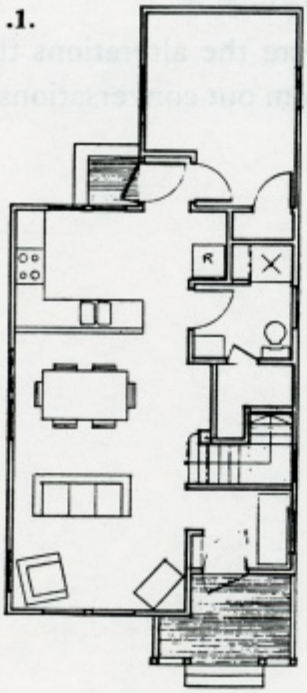


ENTRIES

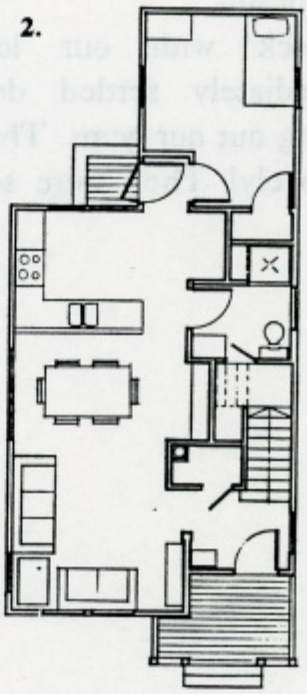
1. Removed closet door
Changed stair-way

Walls:	$ 72
Total:	**$ 72**

2. Moved door

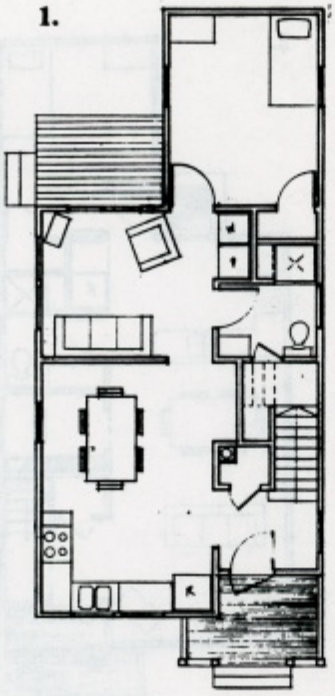
Added column	$ 5
Walls:	$ 58
Total:	**$ 63**

2.



Listening

1.



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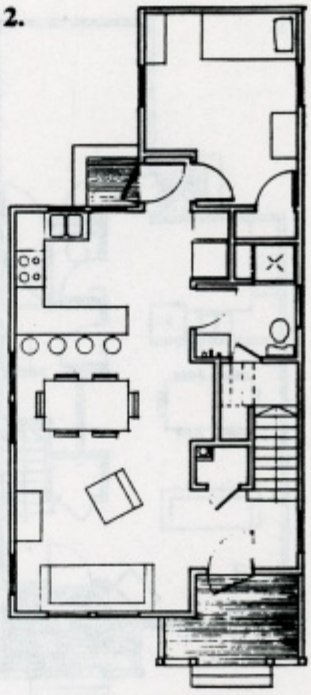


1. **KT & LR PLACEMENT**
   Changed placement of KT / LR
   Replaced out side door
   with sliding door
   Removed wall -$ 30
   Enlarged deck $ 250

   Total: $ 220

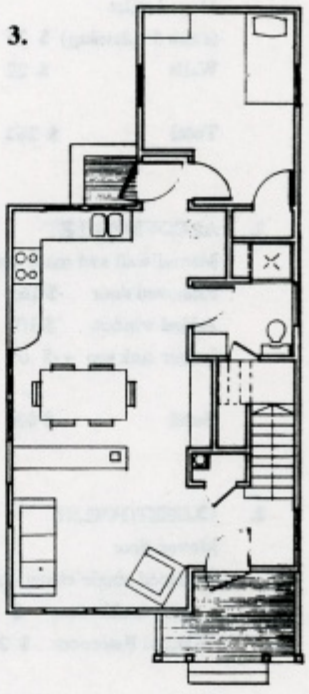
2. **KITCHEN LAYOUT**
   Removed half wall
   Counter space -$ 100

   Total: $ 100

3. **PARTITIONS**
   Book shelf:
   Lumber $ 60
   Column $ 5

   Total $ 65

3.



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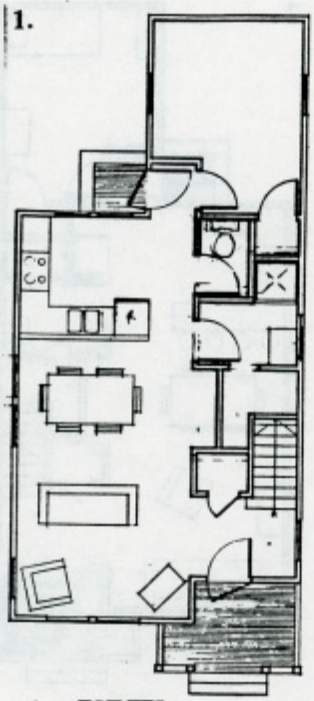
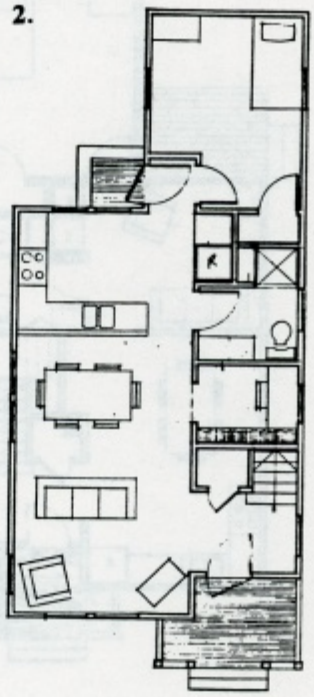


1. **TOILETS**
   Moved door
   Added door $ 165
   Moved toilet
   (extra 5' pluming) $ 75
   Walls $ 22

   Total $ 262

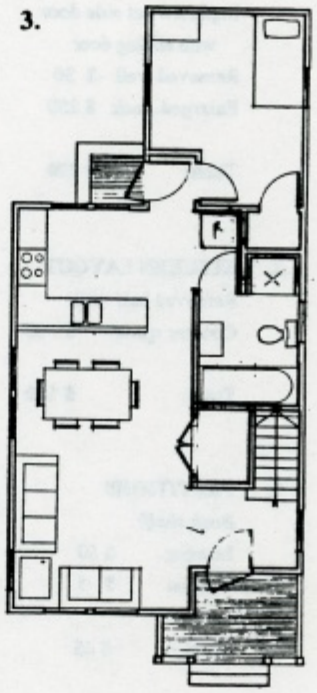
2.



2. **ALCOVE/TOILET**
   Moved wall and made opening
   Removed door -$ 165
   Added window $ 100
   Larger sink top - -$ 65

   Total $ 000

3.

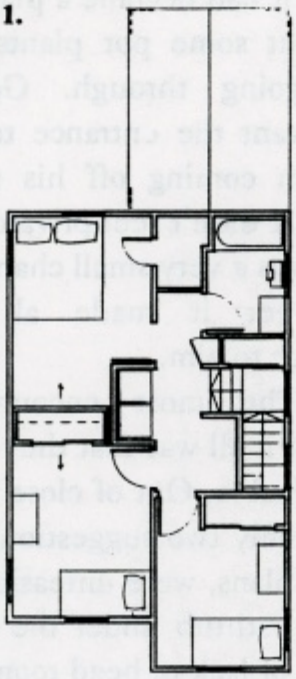


3. **CLOSET/TOILET**
   Moved door
   Replaced single closet door
   with double door $ 75
   Changed Bathroom $ 200

   Total $ 275

Listening

1.



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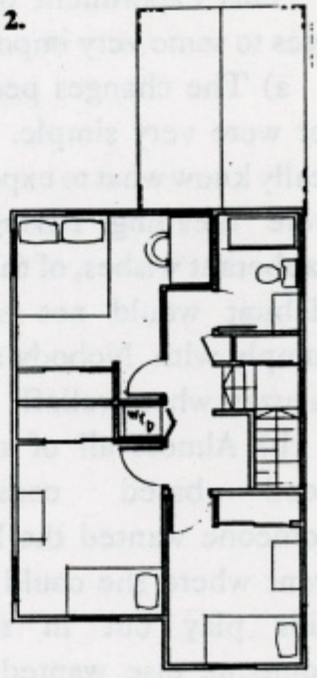

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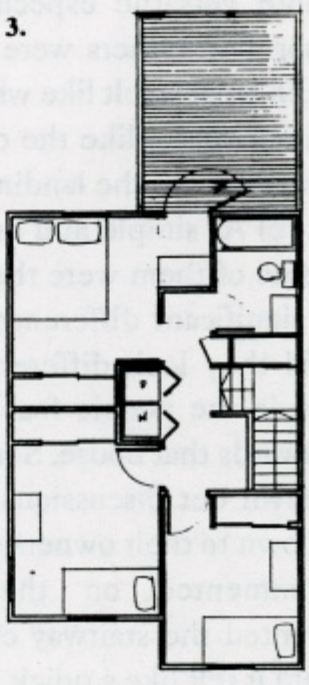


1. **ROOM WALLS**
   Movable closet
   Total: ~$ 300

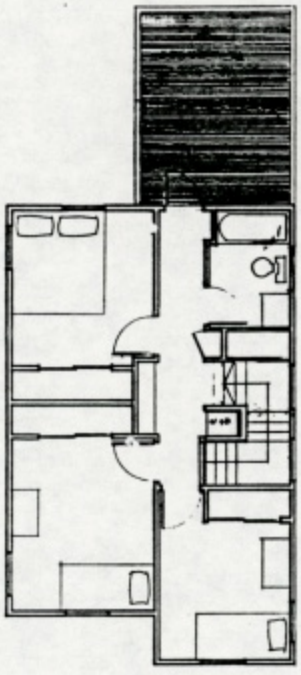
2. **WALLS/DOORS/W&D**
   Switched closets
   Stacked W&D
   Added window $ 165

   Total $ 165

3. **REAR DECK**
   Switched closet
   Added door $ 575
   Top deck ~$ 500

   Total $ 1075

DAVID'S HOUSE



First Floor:
Removed closet door
Changed stair-way
Walls $ 72

Total: $ 72

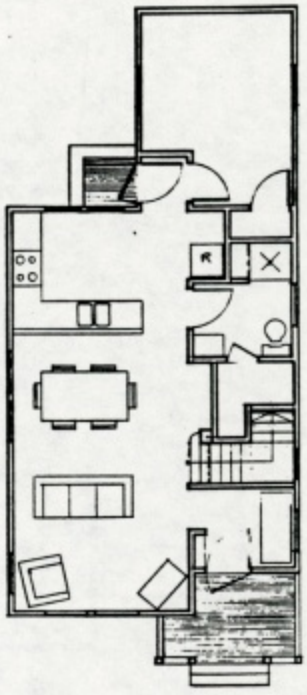
Second Floor:
Stacked W&D
Switched closets
Wallls $ 58
Added exterior door $ 575
Top deck $ 500

Total: $ 1133

GRAND TOTAL: $ 1205

MOVE W&D

Moved wall & door
Moved W&D down stairs
Total $ 000



To get an idea of the different restrictions we might be coming up against, we showed our set of drawings to several people.

Permits: On the whole we knew there weren't any problems with this procedure because after the initial permit was granted to the site, each and every house still had to be issued one separately.

Structural: We spoke with Randy Schmidt, a structural engineer and architect in training, showed him the original blue prints of the house and asked to know if there were any considerations we ought to take in account when making our changes. Basically, if we did not enlarge the overall size (amount) of openings over crucial shear wall areas or over foundation walls we were O.K.

Construction: Our talk with Roger gave us the most insight and the most encouragement. Of Habitat's people he was the first we dared show our drawings to. We went over each option and made notes as for structural feasibility (hold-downs, plumbing location before plywood floor), code requirements (sizes of rooms and closets), possible cost results

(different stair runs, kitchen shapes), and construction sequences and methods(structural calculations and permits). He never put his foot down or seemed opposed to what we were doing, "you're doin' good" that was what he would say.

Implementation: With Peter we discussed the methods of how to go about working with the families and of how to record the changes to the plans. It had to be fairly swift and practical. First we told him of the experience we had with our simulation, emphasizing the immediacy of the process; the first meeting didn't take more than twenty minutes, corrections to what people meant or wanted were agreeable and simple to do. Peter thought it shouldn't take more than four hours and preferably in one session - we weren't so sure about that last point, from our experience we felt both sides needed the extra meeting and time to reflect on what happened. We described how participants were asked to discuss their desires rather than have to wrestle with the difficulties of drawing and trying to fit it all in. He very much liked the idea of discussion.

As for the plans, the part we were most concerned with, he stressed the need to conserve time, seeing that all this work was voluntary, and suggested a quick way of recording the changes onto a separate sheet and attaching it to the original documents. We all agreed that a visit to the site by the designate family would be helpful and that fine adjustments could be done on site in the presence and with the help of the homeowners.

We wanted to know what he thought our chances were of having this approved by the board. He didn't want to promise anything but maybe Habitat would be willing to experiment with two houses and see how that went. It might not be necessary to present to the board instead we could meet up on site one afternoon with Roger and Leonard (the contractor) and discuss this over. In any rate he wasn't quite sure who would carry this out since he had his hands full as it was - We made it clear that if Habitat would be interested in implementing this process we would commit ourselves to carrying it out as part of our course work next semester.

Were we dreaming or what?

We stood out Peter's house in the freezing night going over our meeting with him, not believing what we just heard- Did the tables just turn on us that very moment, or were we mistaken?

Did listening turn into a mutual act of appreciation?

We had less than two weeks to get ready for our presentation before the board. The aspect of cost still had to be settled. Each idea was drawn out separately, we analyzed them to see what the changes meant. In some of them items were only moved about: doors, windows walls; in others, items were added: fixtures, partitions, extra openings, widening of porches; and there were big changes: replacing back room with covered porch, adding rear porch on the second floor, changing stairs.

The cost estimates were taken out of "The Means Cost Estimate" book. In most cases only cost of materials was calculated- labor being free. Only in incidence that demanded professional workmanship, such as pluming did we include the cost of labor.

Most changes, remained within the range of $ 300, making total cost per house way below the $ 1000, the amount set aside in the discrepancy fund provided by Habitat for each family (as part of Habitat's policy each family is given that amount to spend on their house- how ever they see fit). In the porch and deck additions cost was higher, making David's house exceed this amount by $ 300.

We were pleased with these findings- they seemed very reasonable.

Final Presentation

We compiled a nice folder showing the original house and the many categories we had worked on, each option had its changes colored in, followed by three houses that were shown in their entirety. A short introduction expressing our beliefs and intentions was placed at the beginning.

We were noticeably exited; Bethany changed clothes three times that day and I went into a phase of detachment where everything felt unreal.

We met on site, it was very cold. Present were Peter, Roger and Leonard. Seated on one of the front porches we handed out our

brochures and let them read through it. I was grateful to have them, sheer excitement put me at a loss of words.

I don't think we realized how thorough we were at preparing the ground all through the semester, because something very special happened we never got the chance to present: they looked up from their brochures and started a discussion among them- one meant for our benefit.

Leonard opened the discussion by affirming our belief in the strife for empowerment and the role it played in the out-come of building these houses. He then addressed the second point we made; the need of each family to affect the design of their houses. In the discussion they openly admitted their shortcomings in implementing these very important corner stones of Habitat's covenant. Peter was saying that as of now homeowners are given the opportunity to chose their house color, pick out the carpeting, maybe decide upon a book-shelf or the shower, but not to the degree that we are suggesting, and that they agree is needed. He was interested in implementing such a process on a much larger scale and on a permanent basis.

They then turned their attention to the details of our proposal.

Why personal choices over a catalog of possibilities? We reiterated the role of empowerment in this process and the driving need to let people make personal choices of the kind that are unique to each family that then will produce a rich and lively environment to which people could feel related to in a real and personal way.

Working with the families was debated upon. We were suggesting a two stage process, where families were given the opportunity to comment on the changes we had drawn out at a separate meeting from the one they were decided upon, making it in effect a two step procedure- not one. Peter's was concerned about the length of time this required. Leonard felt it was a necessary step to have so that both parties got a chance to think about the changes and reflect upon their implications.

We spoke about the method of marking the changes. The one we had suggested of adding a sheet of

iterations to the original set of plans was seen as viable. Leonard was saying that he didn't foresee any special complications in acquiring permits for these changes seeing that the city issued them separately to each house regardless of how different they were from each other.

Having worked out the main technicalities one question was left open, all eyes turned towards Roger. As construction manager he would be faced with making this come true- could it be done? Did we make a convincing enough argument?

Apparently yes because the discussion suddenly became both animated and concert, we were talking about training, about which houses to work on, about when and who will be doing what.... we were so excited!

Training seemed to be the key issue here they were asking us to look into the possibilities of setting this up, and referred us to manuals that Habitat has on the subject. Everyone realized how important an issue this was, both in terms of empowerment and production of houses. The next two houses to be built will be of the "park " type, construction will begin by end of January-beginning of February, mean while they will allocate the most suitable families for this trial, ones who showed real enthusiasm and interest in this possibility. One could see they wanted it to succeed.

An interesting issue was brought up that of equality vs. sameness. They were saying that in effect not all families will be given this opportunity, that it might not seem fair to those who missed out on it (It was really nice to hear them talk of our proposal as a sought after asset). The three of them agreed that it wasn't Habitat's intention to provide everyone with the same offer, that some families got a larger lot than others or a different house and that it was normal to expect variations.

We restated our commitment to working on this process throughout next semester, when they turned to us and said they were looking for a way to insure the continuation of this process so that it would not turn into a one time experiment but rather be worked and improved upon for future projects to come.

That was incredible! We could not believe what we had just

heard. At that moment I loved Bethany, I loved the people of Habitat, I loved my life; more accurately I felt I had lived a life. We had made it happen- I realized, what we were experiencing was no other than the effects of empowerment.

We went into Jupiter's to celebrate, and found ourselves in that familiar pose we had adopted along the course of this semester, of sitting in cafés and discussing our project. I drove home that night with a festive green helium balloon tied to the back of my scooter- I didn't even feel the cold.

Epilogue

In this article I have tried to argue the validity of two issues: that of our building process; does it make a better environment that people can feel personally related to, and that of listening; has it been responsible for the outcome of our project. This semester's work has by no means proven these issues, but rather raised the questions related to them, questions that our following semester's work will hopefully resolve, along with the outcome of building two "park" type houses.

We are trying to build quality houses at very low cost with the use of simple means. It is our firm belief that by providing an opportunity for people to personally affect their lives a more wholesome environment can be created, one which will express more truthfully ones self, that will help one create a bond of identity with their surroundings, and bring about a true sense of belonging.

It can only come about if done with this intent in mind. In other words, without it being a conscious process at every step of the way and set against one's personal feelings it won't bring about that change. Intent is one of the "materials" that goes into making a house of that quality.

Our process does not provide one with an array of possibilities from which to choose, as would a catalogue- choice in its self will not bring about the results we are after. We are strongly advocating personal involvement, in other words; empowerment. Watching the effect of one's deeds, stemming out of true need, gives one the tools with which to make an educated judgment about their lives, not only of what should be done but also at what sequence.

This is no mean thing, it is the corner stone of our process, each decision not only informs us of the next step to come, but actually affects it.

This is a form of listening. It is true of any aspect of life, and I would argue that it is this same understanding that governs Habitat's actions; the way in which the group "pockets" of responsibility, made up of devoted volunteers, work with each other to form a partnership with god.

It is this same awareness that has made us conscious of the need to base our work as a building process rather than a design based one- resulting from direct interaction with the homeowners and the site rather than a projection of ideas.

I feel that this process has made better listeners out of us, much more aware of what we are doing and how it is affecting other people's lives. I assume that the big question is whether listening was responsible for Habitat's willingness to work with us. I have often asked Bethany that question: Why in the name of god should they listen to us? When placing the question that way one immediately realizes the answer: "in the name of god". We both wanted a partnership with life. Our process was enhancing their own. It really is a match made in heaven. But that doesn't in any way explain why they were willing to stop in mid stream and pay attention to us. Change their ways by admitting they weren't carrying out that which they were advocating and introduce a rather radical process of building, by placing their trust in two students that one day materialized on their door-step. That, in my mind, has no other explanation other than their unique ability to listen. For that reason alone this experience has been astonishingly successful.

Straw Bale Construction
A Sustainable System for Ownership

Ann V. Edminster

Straw bales are of interest to many builders; but the practical questions that come up in the detailed effort to use them, and to make buildings that are safe and long lasting, raise numerous important, and yet unresolved questions.

In the following paper Edminster first gives a summary of what she understands to be the obvious potential advantages of the method. These advantages may be summarized by the fact that, in theory, and in principle, straw bales can be used rapidly to make buildings that are full of feeling; they allow layout by users, with simple steps to fix or consolidate the layout; they therefore have the ability, potentially, to allow construction of buildings which are very well adapted, and which therefore approach the "belongingness" spoken about in the editorial introduction of this volume.

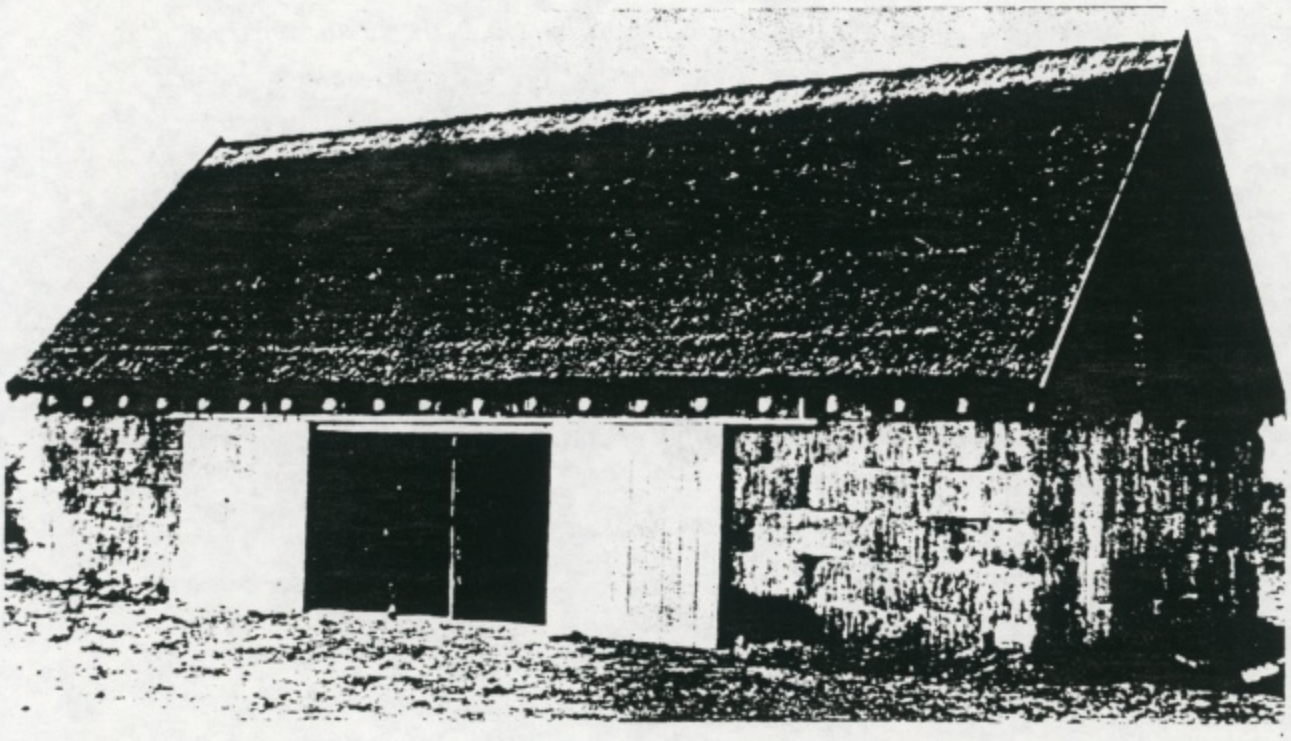
But there are numerous practical difficulties. Once straw bale construction is made consistent with applicable codes (in their present form), some of the beauty of using them disappears because they need to be backed up with other structural and construction features (for shear, waterproofing, insulation, electrical, and so on), which almost begin to dissipate the potential beauty and advantages. Further, it is not yet clear how to achieve a construction process which does allow users to lay the building out, as they like it, and then have this consolidated. If the building is designed, drawn, and approved in the normal manner, the most fascinating aspect of straw bale use disappears.

Edminster tries, in the second half of her paper, to discuss these problems, and to indicate solutions, which could, with time, bring straw bales into full flower according to the potential which many have seen in them.

A little over a year ago I first heard about using straw bales to build with. I was immediately captivated by the idea: here was a material that was completely renewable (in a single growing season), non-toxic, plentiful, and cheap. *And* it actually produced remarkably appealing buildings. It sounded like the ideal building material. I determined to investigate further. The Building Process studio presented me with a valuable opportunity to expand my research beyond traditional academics into a real-world, live project.

Introduction

My interest in straw bales sprang primarily from a sense that they offer an environmentally sound, affordable alternative to conventional stick-framed houses. The focus of the studio, however, was on something different: building processes that would contribute to people's "emotional possession of the world, or 'belonging.'" I believed that building with straw bales would do so (in addition to its myriad other virtues). Now, after having spent the last four months working on a straw-bale project and intensively studying this unique building



process, this conviction has become firmly rooted. However, it has also become clear to me that there are numerous issues related to using this method that are far from resolved. This paper is an attempt to articulate a number of those issues, as well as to document what I perceive to be some of the reasons for building with straw bales.

I begin by recounting my own history of learning about straw bale construction. Then, because building with straw is such a novel notion to most people, some background information on the history of straw bale construction and the basic construction method follows. The body of the paper is devoted to a description of some of the virtues of the method and a discussion of straw bale construction issues.

The Investigation

The story really starts nearly a year ago—last January—when I undertook the design of a 20,000-square-foot inn as a studio project. The emphasis of the studio was on structures and construction; as I had been introduced to straw bales the prior semester, I decided to pursue the inn project as a straw bale design. The work was very interesting and informative, particularly as virtually no information existed (nor does it today) about using straw bales in multi-story structures. At the final review for the project, one of the reviewers referred me to a friend who was the owner of a straw bale cottage then under construction in northern California. As it happened, the cottage was the first code-approved load-bearing straw bale structure in the state. I spent a long weekend later that summer working on the project. I was one of several volunteers to assist with securing stucco wire, wrapping the building envelope with Tyvek, and placing bales into the gable ends of the loft.

When the fall semester began, I enrolled in the Building Process studio because it required that the semester's work be engaged with a real-life project; this would allow me the freedom to continue my investigation into straw bale building. I contacted the architects of the load-bearing cottage—Bob Theis and Dan Smith of DS&A in Berkeley—and arranged to work with them as a volunteer on another straw bale

brochures and let them read through it. I was grateful to have them, sheer excitement put me at a loss of words.

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project for which the firm had just been engaged, a water bottling facility in Idaho. I was fortunate enough to be treated as a full-fledged team member (one of three, along with Dan and Bob), and played a substantial role in the design development process. As the principal draftsperson on the project, I was intimately involved in resolving numerous knotty technical issues related to accommodating straw bales into the complex geometry of the radial plan frame building. This afforded me considerable exposure to the issues peculiar to straw bales (as well as some unique to this particular building!).

As work on the Idaho project proceeded, a number of other opportunities also came my way via DS&A. The first of these was a straw bale barn-raising workshop, during which I participated in raising the barn walls from bare footings up to about eight feet high. We installed waterproofing at the base of the wall, put in sole plates, "cut" and placed wall bales, pinned and plumbed the walls, and inserted window frames.

Later, Halloween weekend saw the convergence of a number of preeminent bale enthusiasts in San Luis Obispo. Cal Poly architecture professors Polly Cooper and Ken Haggard hosted David Bainbridge and David Eisenberg, who were scheduled to appear on a sustainable design panel that week with Pliny Fisk; Bill and Athena Steen, co-authors with David Bainbridge of *Plastered Straw Bale Construction*, were also passing through with their children on a western states straw bale odyssey; and Dan Smith, Bob Theis, and I attended from Berkeley. The weekend's highly informal agenda included a lot of widely-ranging straw bale "shop talk," visits to Polly and Ken's straw bale studio under construction on their fire-devastated site in Santa Margarita, mocking up a corbeled straw bale half-dome, a straw bale presentation by Bob and Dan to Polly's sustainable design studio, and conferences with Cal Poly engineering professors Jake Feldman and Sat Rihal about possibilities and strategy for conducting straw bale structural tests.

Finally, during recent weeks I have been part of a competition team with Bob, Dan, and Kelly

Lerner, a recent M.Arch. graduate from the University of Oregon. We have been working on a system that uses straw bales for building both walls and roof, in vaulted and domed forms. The focus of this work is on furthering the evolution of this relatively new method.

A Little History

The history of bale construction is not as brief as most people initially suppose. In the cosmic scheme of things, however, it is pretty recent: the first straw bale structures were built in the late nineteenth century in the Sandhills of Nebraska. Early settlers there discovered that the sandy soil was not good for building sod houses, which had been built by settlers elsewhere on the plains. Lumber was scarce. But grasses and grains were the principal crops of the Sandhills, balers had been introduced in the 1850s, and baled hay was everywhere. The earliest known Nebraska bale building is a school built in 1886, the latest a dance hall built around 1946.

(Note: hay is the cut grain crop before the seed heads have been stripped from the stalks; straw is the waste product left after the grain has been removed.)

Bale construction may well be the only vernacular building system developed in the last 100 years. Without going too far out on a limb, it certainly seems safe to venture that it is the only vernacular system that has emerged in this country in the last century. This unique stature, in and of itself, suggests that building with straw bales is a process that people "own," wholly and naturally. It is not a system that was "invented," and promulgated academically or commercially; it simply arose, spontaneously, from people's needs, resources, and ingenuity. It is also interesting to note that it is quite different from most other building techniques in that it represents the adoption of a product of another industry, created originally for quite different purposes. Brick, adobe, and dimensional lumber, by contrast, were devised specifically for building. (Michael Reynolds' tire house method may be the only other system like straw bales in this respect.)

Another testimony to the desirability of straw bale homes is that in many instances, the early

Nebraska straw bale houses were intended to be temporary and were even left unplastered. They were built to house the family until they could afford to build of wood. However, after having lived in the straw bale houses for some time, the families concluded that their houses were, in fact, better than wooden houses, plastered them, and made them their permanent homes.

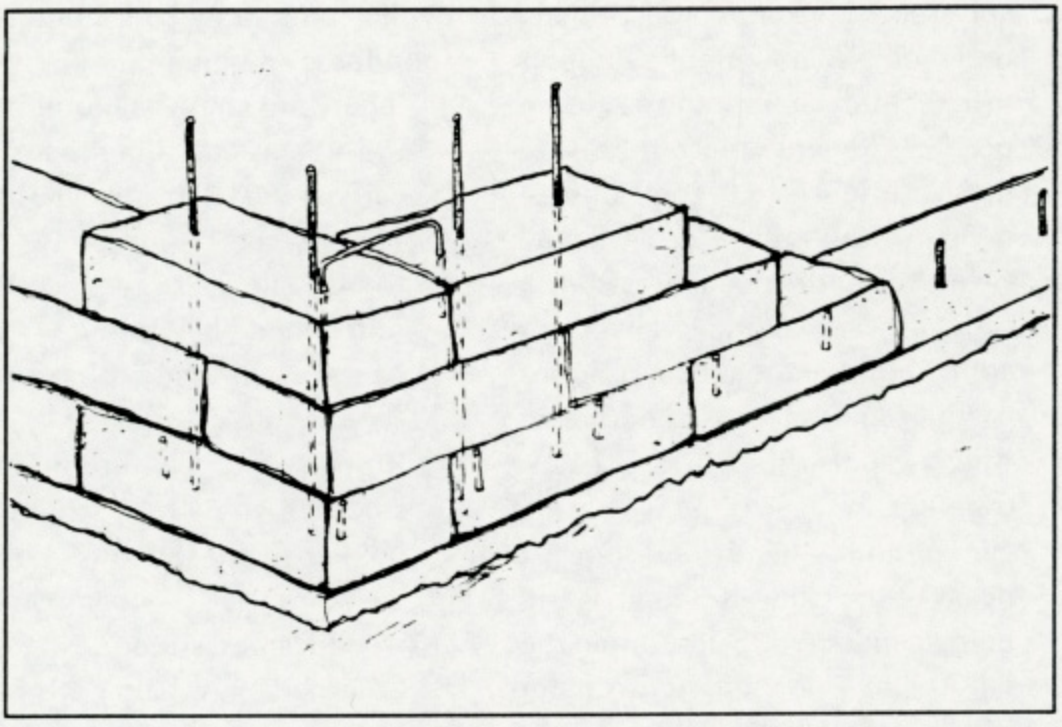
The current resurgence of interest in straw bale construction dates back about a decade, and seems to have originated in the Southwest. Arizona and New Mexico remain, to date, the leaders in the straw bale revival. The first building code regulating straw bale construction has just this year been adopted in Pima County, Arizona (Tucson). Santa Fe, New Mexico, is not far behind.

The Evolving System

Second only to the question, "Why straw bales?" I am asked *how* one builds with straw bales (and then, hard on its heels, "But doesn't it rot?" and "Don't rats nest in it?" and the like). A brief introduction to the building system may be helpful to those newly exposed to this idea. It should be pointed out that the synopsis that follows is a very broad generalization, and almost as many variations exist as individual buildings, since this building method is still in the early stages of its evolution. (Although the method originated more than a century ago, relatively few buildings were built, and they predate building codes. Present development efforts are aimed at code-acceptable refinements and adaptations of the method pioneered in Nebraska.)

Straw bale buildings are most often built on conventional foundations of one sort or another, usually with concrete slab floors and perimeter footings. Because moisture is the biggest threat to the integrity of a straw bale structure, the bale walls are typically built above a concrete curb raising them several inches above the surrounding grade. Embedded in the perimeter concrete are "imbalers," steel rebar pins whose ends protrude the height of a bale or somewhat less and on which the first row of bales is skewered.

Straw bale walls are assembled much like brick masonry, in running-bond fashion; the bales



Typical Straw-bale Wall Construction.

are, in effect, giant, fluffy building blocks. Conventional wisdom is to allow a straw bale wall to rise no more than seven courses high unsupported—this makes a wall up to ten feet or so tall, depending on the height of the bales. As the walls go up, lengths of rebar or bamboo are spiked through layers of bales to knit them together, forming a sort of thick basketry matrix.

There are two divergent schools of thought on how the roof is supported. One is that the ideal approach is "Nebraska-style," in which the bale walls themselves support the roof. The other is to carry roof loads with a post-and-beam framework and use the bale walls as nonstructural infill. Both methods have ardent supporters, and strong arguments exist for each viewpoint. More on that later!

Straw bale buildings are almost always covered with a conventional roof frame, usually wooden— sometimes trusses, sometimes rafters. Steel trusses have also been used.

Walls are usually finished, inside and out, with plaster or stucco. Although cement plaster

and stucco appear to predominate, there are also numerous examples using mud, lime, and gypsum plaster. Cement stucco on a wire mesh is often used to contribute to the building's lateral (wind/seismic) load resistance capabilities. Some advocates argue, however, that cementitious coatings inhibit the migration of water vapor through the bales, trapping moisture and causing condensation and subsequent decay of the bales. Research is still being conducted to determine the nature of moisture movement through straw bale walls.

The plaster or stucco wall coatings protect the walls both from surface moisture (rain, e.g.) and from pests; the walls are sealed as wood frame walls are sealed, so insects and rodents cannot penetrate.

Performance

Besides pests, other aspects of straw bale construction about which performance questions frequently arise include vulnerability to decay and fire. Study of historic Nebraska examples, as well as contemporary buildings, has uncovered potent evidence of straw bale buildings' soundness and durability:

- There are straw bale buildings in Nebraska dating back as early as 1904 that are still in use.
- Houses combining straw and wood show straw sections untouched by termites and beetles while adjoining wood sections are eaten away.
- Properly waterproofed stuccoed straw bale structures hold up to moisture every bit as well as comparable wood-framed structures.
- Stuccoed straw bale walls have been tested to withstand fire twice as long as conventional wood-framed walls. Practical experience supports this result: a recent Southern California fire decimated an entire neighborhood, leaving the only structure unscathed a plastered straw bale garden bench at the home of Ken Haggard and Polly Cooper (architects of the first code-approved straw bale building in California).

In addition, straw bale buildings offer superior thermal, acoustic, and (to many) aesthetic performance over light wood frame buildings. They also hold the potential for significant

environmental benefits. Paul Fritz (UCB M.Arch., May 1994) showed in his thesis that substantial energy savings could be achieved using straw bales. Further, the vast majority of straw, an agricultural byproduct, is presently burned in the fields. Making productive use of waste straw would lessen air pollution while reducing demand on the timber industry (which most leaders in architecture and construction recognize as a dire necessity). Yet another advantage to building with straw is that it is a technique that requires little or no carpentry skill, making it a highly accessible method for owner-builders, for many of whom home-building is otherwise financially out of reach.

There is, then, ample evidence that building with straw is desirable from a number of technical or quantitative perspectives. It must also be demonstrated that straw bale construction produces buildings that people would *want* to live and work in.

In fact, those proponents of straw bale construction who have first-hand experience give voluble testimony to the delights of building with straw and living in straw bale abodes. Some of the benefits have already been alluded to: improved thermal comfort, reduced energy costs, lower capital cost, and acoustic buffering. However, there are other dimensions to straw bale buildings that are less well documented and which this paper attempts to address.

The Virtues of Straw Bales

The thermal, acoustic, and environmental advantages to straw bale construction have already been mentioned and are easily substantiated. (In brief, bale walls have a thermal resistance of around R-50; their porous bulk provides such effective acoustic protection that they are being considered for use in freeway walls; and as a low-embodied-energy, totally renewable, non-toxic resource, straw bales are unparalleled.) However, there are other attributes of this building system that, while often alluded to by straw bale enthusiasts, are largely undocumented. Still others are entirely undocumented, to my knowledge. This chapter is a modest attempt to begin to fill that void. (With my humble apologies

to the authors of straw bale references for gaps in my own knowledge, and with thanks for their contributions!)

▫ Low Cost

Perhaps the most important way in which building with straw bales contributes to "ownership" is the literal one. The affordability of straw bale construction *literally* makes it possible for more people to own their own homes. This has been empirically demonstrated. A number of the houses built in recent years in the Southwest U.S. have cost five to ten dollars per square foot, a figure unthinkable for standard construction. Several others are in the range of ten to twenty dollars per square foot. The owners of these homes readily acknowledge that buying or building a home by other means was not possible for them. (Luxury straw bale homes cost a mere $100 per square foot, half or less the going rate for luxury frame houses.)

▫ Natural Material

While the focus of the studio was on building processes that contribute to people's "belongingness" to the environment, low environmental impact has been the primary virtue for which straw bales have been touted. My intuitive sense has been that there is substantial intersection between these two sets of values. There are a number of factors that make this make sense:

- People feel most "at home" in buildings that are healthy—that don't produce allergic reactions, are thermally and acoustically comfortable, and so on.
- The highly processed, manufactured, and synthetic materials that most homes are made of and filled with cannot be made or built with by normal people with everyday, common resources; thus the usual home distances itself from its inhabitants by the very nature of its composition.
- For the same reasons stated above, homeowners cannot only not build their own homes, even modifying them to suit their own unique needs is often infeasible or fraught with difficulty.

I believe the foregoing reasons account for people's overwhelming preference, when cost ceases to be the deciding

factor, for natural and low-tech materials. Wood, stone, and tile win, hands down, over sheet vinyl, synthetic carpeting, and even premium products such as Corian. This makes sense: after all, people understand where wood and stone and tile come from, even if they're not themselves adept at working with the materials. They respond to natural materials as a part of the world that they know and belong to. (Who feels an affinity for Tyvek?)

There are few natural structural materials that are socially acceptable in westernized cultures. Adobe, in the Southwest U.S., is a prized natural construction material, but very costly. David Easton's pneumatically impacted stabilized earth ("PISE"), a modern-day method inspired by rammed earth, is also touted as natural and environmentally friendly but contains large amounts of Portland cement, a material that is highly processed, high in embodied energy, and derived from finite resources. PISE is also generally limited to high-end homes.

Few people aspire to living in teepees, hogans, or huts made of branches, leaves, skins, and mud. Straw bales, then, are unique as a structural material that is natural, non-toxic, low in embodied energy, plentiful and widely available, inexpensive, *and* desirable.

▫ Imperfection

Rarely is imperfection or irregularity seen as a virtue, but it is patently so with straw bale building. It is precisely its imprecision that makes it accessible to ordinary people. The tolerance of a straw bale wall is measured in inches, not in small fractions. Slight bulges and hollows are an inherent characteristic of the method and in fact add to its beauty, as ridges and drips do to a hand-crafted ceramic pot or slubs to a hand-woven garment. They are mute and eloquent testimony to the human hands that lovingly shaped the building. (It is an irony that the building block itself is a manufactured product, albeit a crude one.)

When a person is given a material with the freedom of creating something with high tolerances, the result is liberating. Where most people would be loath to pick up a framing square or Skil-saw to build something

(especially something as important as their own house) without prior training and skill, total novices leap in with great glee to create their first bale wall. The knowledge that craft is not a barrier cannot be overestimated as a factor in the appeal and success of this building process.

▫ Ease of Construction

Related to, but distinct from, the felicitous imperfection of straw bale building is the actual ease of construction. The straw bale module is "friendly." It is a size that is a near-perfect compromise between the limits of human manipulation (bales weigh 50 to 90 pounds and are easily handled by two people) and a coarse unit that therefore builds very quickly into a large assembly. The walls for an entire home are typically raised in a single day, or sometimes two, frequently by an unskilled crew. The tools used are on the same order of delicacy: long-handled sledge-hammers and large-toothed, two-foot hay knives are the most common implements. Frame carpentry, in comparison, requires precise tools and a high level of skill to produce a house that is not unsightly (and possibly unsound).

While many wall-raisings are now being done under the tutelage of experienced straw bale builders, there are numerous stories of homeowners successfully building on their own, armed solely with a pamphlet or video for guidance. Home construction is usually done at least in some part by the ultimate inhabitants themselves. It may be this quality most of all that makes straw bales an appealing building material, one that contributes to that sought-after sense of belonging. When one participates in the making of one's own home, how can it not engender a greater, deeper feeling of ownership than when one does not? Straw bales make that possible for more people, perhaps, than any other contemporary (western) building method. This seems a self-evident virtue.

A few words of caution apply, however. The ease of construction is in inverse relationship to the stringency of the structural requirements. Where codes or loading concerns dictate the use of a post-and-beam frame, more construction skill is required. Likewise, the more complicated the building shape, the more

challenging construction becomes. It should also be noted that there are skilled building trades required for building a straw bale home just as for a conventional home—plumbing, electrical, mechanical, and others.

▪ Thick Walls/Sheltering

Nearly everyone I have talked to about the manifold virtues of straw bale houses mentions the thick walls. Straw bales come in numerous sizes and shapes. Two rectangular block forms predominate: the two-wire bale, roughly 14" high, 18" wide, and 36" long; and the three-wire bale, about 16" high, 24" wide, and 48" long. The fibers lie parallel to the width dimension; that is, in the two-wire bale the fibers run 18" across the width, and in the three-wire bale the fibers run 24" across the width.

Most often, walls are created by laying up the bales in a running-bond pattern, one deep, placed "flat"—that is, with the largest face (24" x 48" or 18" x 36") down. Less often, usually in post-and-beam applications, the bales are laid "on edge," or with the next largest face (16" x 48" or 14" x 36") down. These two methods create walls which, when finished on both sides with plaster or stucco, range from about 17" thick (two-wire bales laid on edge) to 27" thick (three-wire bales laid flat).

The thick walls are appealing for a variety of reasons, principal among which are the feeling of substance, privacy, enclosure, shelter (and, of course, quiet). They also create the opportunity for variations in the shell of the building, from surface texture and ornament to wall niches to built-in bancos. Because bale walls are strongest with fewest penetrations, window and door openings tend to be small and few. This contributes to the comforting, womblike atmosphere in a straw bale home.

▪ Shaping

Straw bales offer flexibility in creating form in several ways. Perhaps most importantly, bales can be retied into shorter lengths, so custom bales can be made to fit where needed.

Bales can be trimmed and sculpted using a hay knife, electric carving knife, hedge trimmer, or chain saw. This makes it possible to bevel edges for splayed window and door reveals, for instance. Niches and recesses are also easily

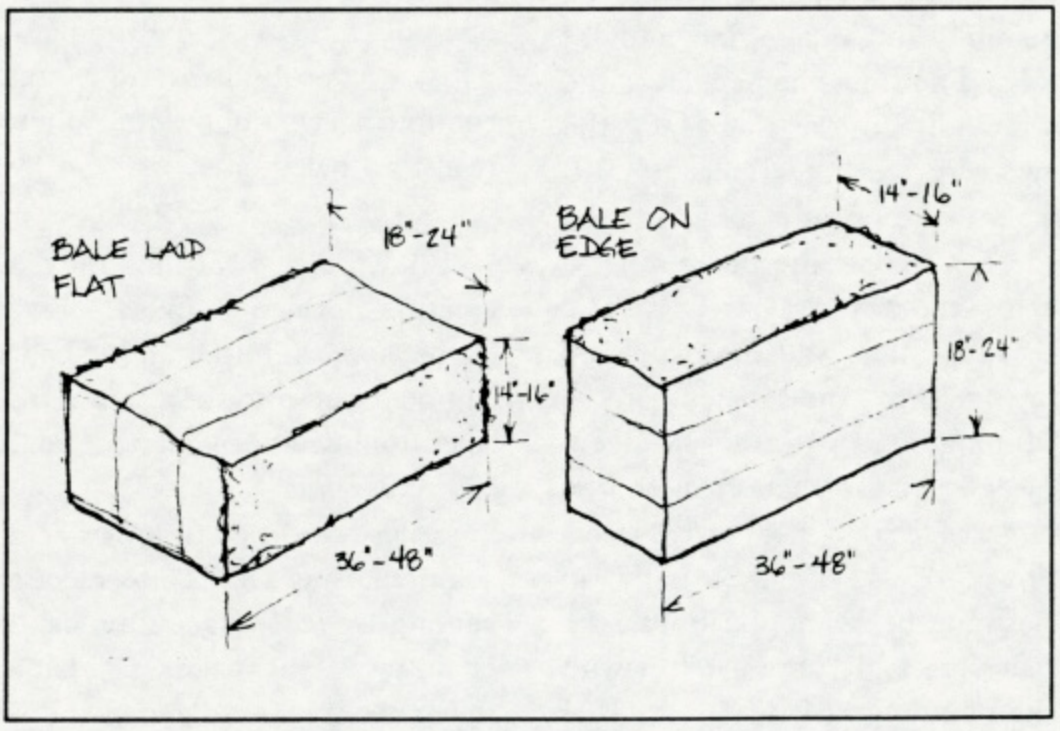
carved into straw bales (laid flat—when bales are laid on edge, the bale ties are in the way.)

Individual bales can be made to curve along either longitudinal axis. This is most commonly done by resting one end of the bale on a raised surface such as a beam, slab edge, or another bale; then applying pressure to the middle of the bale, forcing it to bow where it is unsupported between its two ends. This works somewhat better when pressure is applied to the side of the bale without ties than to the one with ties.

Bale walls can also be laid up to form curves by rotating each bale slightly with respect to the last. Typically, when this is done, the wedge-shaped spaces formed between the bales are stuffed with loose straw (called "chinking").

Courses of bale walls laid in curves (as described above) can be "corbeled" so each projects inward somewhat from the one below, to form domes and vaults or coved corners or squinches.

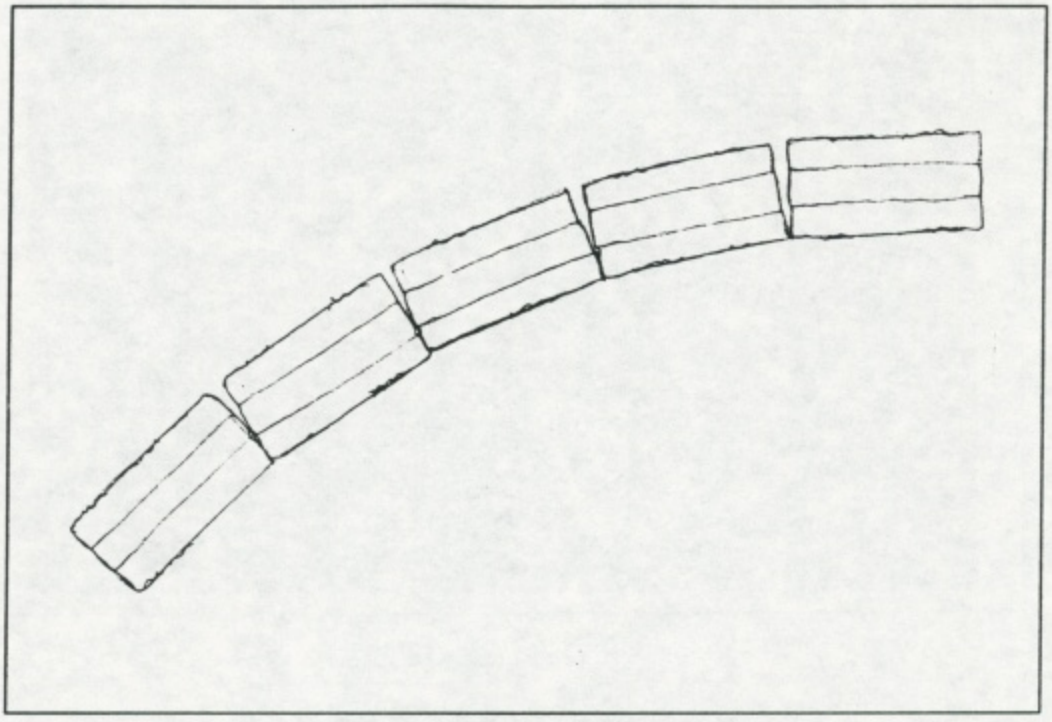
Another possibility is to tip each course with respect to the last by inserting wedges between the



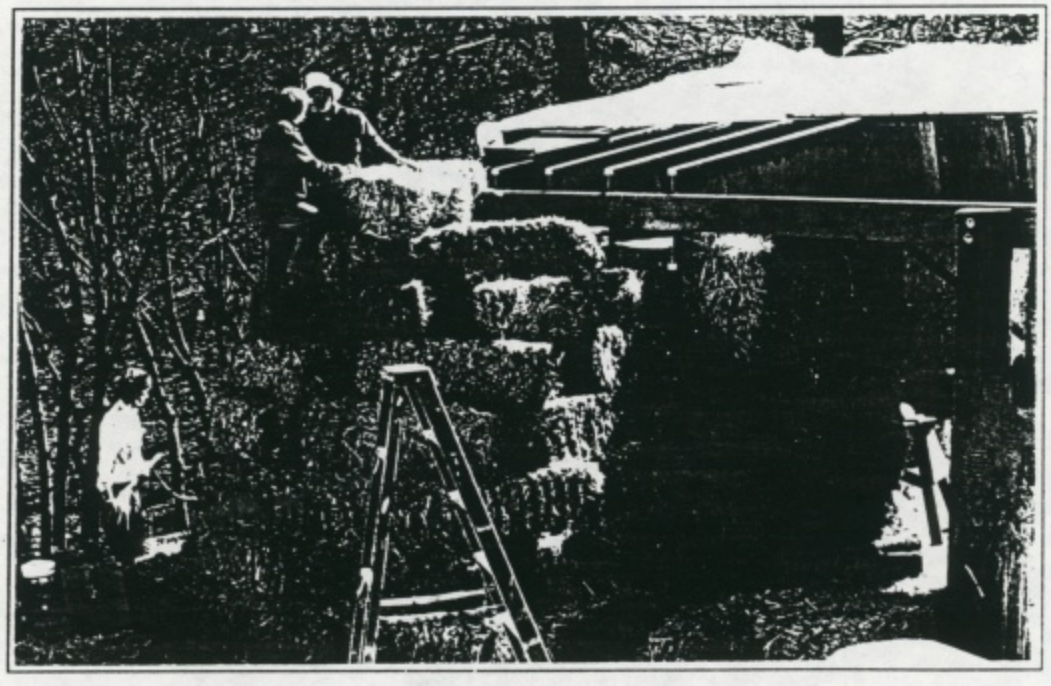
Bales laid flat and on edge.

Bevelled bale, hay knife.

Curving a bale.



Straight bales laid in a curve.



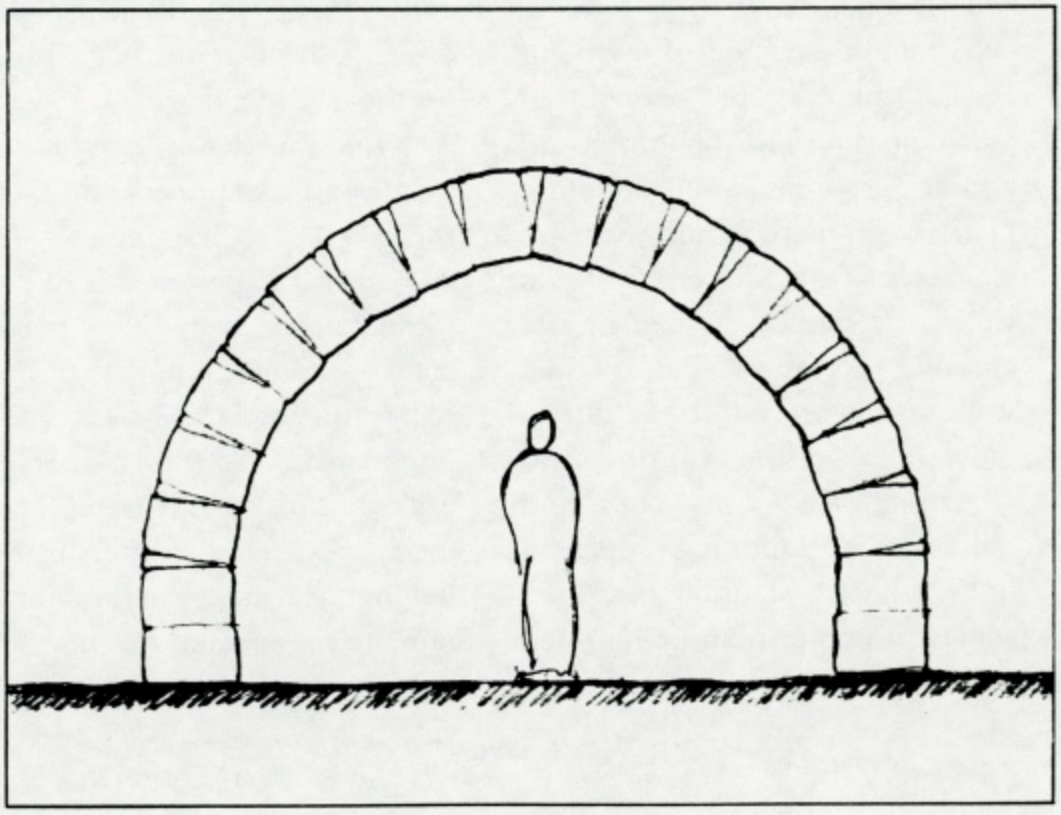
Corbelled half-dome.

courses at their outer edges; depending on the thickness of the wedge and the bale dimensions, this produces curved wall sections of varying radii and is another method that can be used to form domes and vaults.

▪ Dynamic Opening Layout

Straw bale building offers one rather obvious way of permitting the builder to dynamically determine the locations of openings on site, from within the building envelope, and with a realistic perspective on the ultimate interior space. This, although it is not generally done, appears to be extremely straightforward. Its only unique demand on the building process is a day or more during construction for this proposed step, and accommodating the order lead time for the doors and windows resulting from it.

The proposal is this: once the first one to three courses of bales are in place (depending on the



Wedged bale vault sections.

nature of the building and the anticipated uses), the remaining courses are put into place, without the usual pinning, with the builders/tenants adjusting the sizes and placement of openings until they are satisfied.

An additional refinement of this method would be possible if the building plan allowed for straw bale interior partitions, as well. If this were the case, those walls could also be laid up and adjusted similarly.

This type of mocking up is very problematic with frame construction because of the need to cut lumber to size, brace partitions, etc. The frame walls are also transparent and therefore poorly simulate the ultimate character of the space. With bale walls it is quite easy and in fact closely resembles the normal wall-raising procedure. It differs only in that the shifting and adjusting are conscious and deliberate, and pinning is delayed until a happy solution has been achieved, rather than being done by blind adherence to a set of plans.

▫ Affinity

People respond joyously and gleefully to the experience of handling and building with straw. The excitement of being able to participate in a building project is palpable. Particularly for women, traditionally excluded from the process of creating homes and other buildings, it is a powerful experience. At the Sonoma barn-raising I attended, at least half of the participants were women, ranging in age from twenties up to sixties. There was a task for everyone, regardless of age, gender, or ability. Many of the men were white-collar workers and had delightedly shed their office garb in favor of "grubbies" for the day's work.

I find that nearly everyone has a little of the architect or builder in them, and the straw bale wall-raising experience is like the ultimate "dress-up" or "playing contractor." Even better, because the results are real—everyone in attendance can claim a piece of the project. This, too, is important in fostering a sense of ownership of or belonging to the environment. I now have a stake in the little community of Sonoma, and that community garden, in a way I never would have otherwise.

▫ Community Building

There is another inescapable part of the straw bale building experience, and that is the aspect of community building. Each experience of which I have been a part has been strongly colored by this force. As I described in the preceding section, I now have a connection with the community of Sonoma that I previously did not. Similarly, as I have met and worked side-by-side with other straw bale enthusiasts, I have forged bonds of common purpose and shared labor with them and their projects.

It could be argued that this aspect of straw bale building might be transitory; that, as the method gained acceptance and became widespread, one might find little in common with one's co-workers on a straw bale project. I believe that, ideally, building with straw will be accepted and dispersed precisely because it is a hands-on, owner-builder method. It will enable more and more people to build—and to *have*—their own homes. However, examples to date and earlier parallels in our culture and others also suggest that it will remain an activity which at certain stages will involve the cooperation and participation of the wider community.

It is certain that there will continue to be those with the means to have others build for them, and they will be the losers in this respect. But the vast majority of the populace cannot afford hired labor to construct their homes; now many can scarcely afford homes at all, let alone professionally built. Therefore, this building process holds the promise to fill a void in the fabric of our communities created by the domination of mass construction.

Construction Issues

Most of the construction issues surrounding straw bales come back to the perennial debate about load-bearing versus post-and-beam techniques. The principal reason most often cited for building "Nebraska style" is that it uses less lumber (also less steel and other non-straw, precious resources) and is therefore more "environmentally correct." This assumption bears examination. The second most common reason given is that it's easier than the post-and-beam method—it requires less

carpentry skill. Noone seems to dispute this obvious advantage.

Proponents of the post-and-beam method also claim environmental benefits, although with a primary emphasis on the insulative qualities of straw. The rationales for this non-load-bearing option are twofold: avoidance of the unanswered questions about the structural performance of straw and the accompanying difficulty in obtaining building official approval; and eliminating the apparently perennial difficulty in seating a conventionally framed roof on a wiggly straw bale wall.

This debate raises two important questions (at least). Does building "Nebraska-style" in fact use less material? And what are the qualitative impacts of choosing one method over the other?

▪ The Material Question

Straw is an inherently flexible material and therefore prone to deformation under loading. As a consequence, one of the dominant structural concerns with straw bale buildings is the effect of loading on the outer stucco or plaster shell. If the walls are allowed to deform excessively, the shell can crack and allow moisture to intrude, jeopardizing the integrity of the entire structure. So, somehow, every straw bale structure has to be rendered invulnerable to excessive stresses on the shell. This generally entails either choosing the non-load-bearing option or minimizing the wall deformation before applying the outer stucco or plaster covering. Where vertical loads are the prevailing concern, this is most commonly solved by letting the building settle for a month or more after roofing before finishing the walls.

Particularly here in California, where earthquakes are an ever-looming threat, the question of how lateral loads are dealt with assumes as large an importance as how vertical or gravity loads are transmitted through a structure. It is instructive to examine specific solutions that have been employed. The two groundbreaking straw bale building projects here in California illustrate the two basic approaches to building with straw. The Noland house in Lone Pine, designed by Polly Cooper and Ken Haggard, is a post-and-beam structure. Cottage 13 at Shenoa in

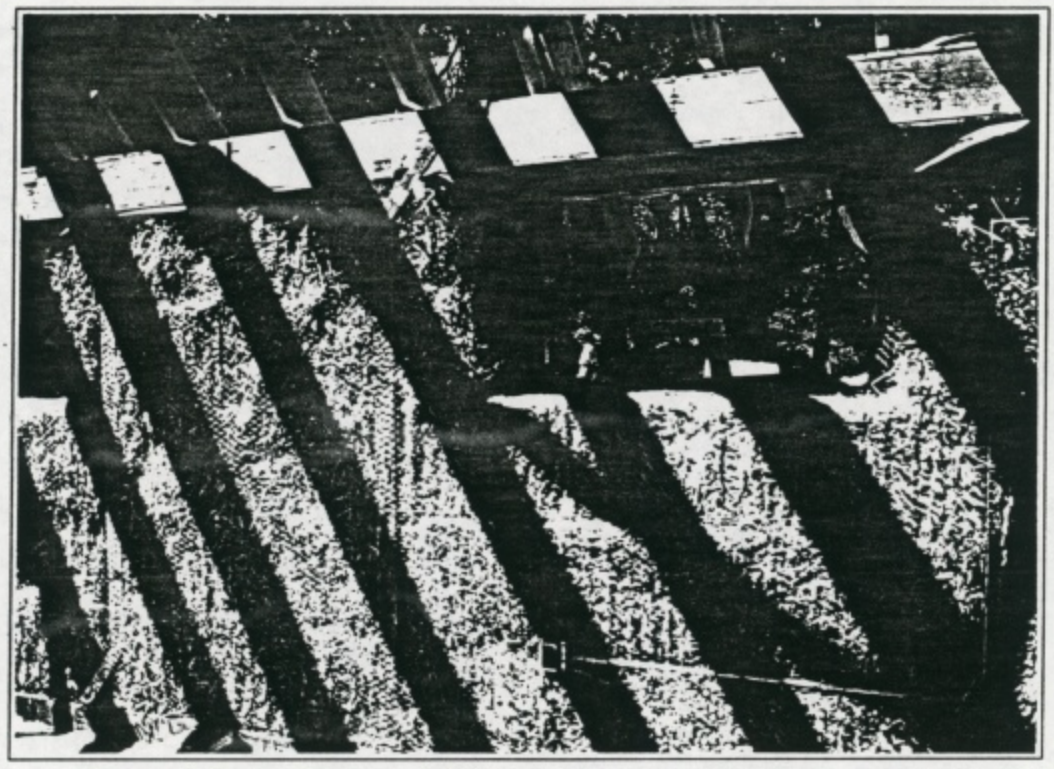
Boonville was designed by Bob Theis as a load-bearing straw bale structure.

In the Noland house, the post-and-beam frame carries both the vertical and lateral loads. This system eliminates the concern about stresses on the stucco skin, as the loads are not transmitted by the straw bale walls.

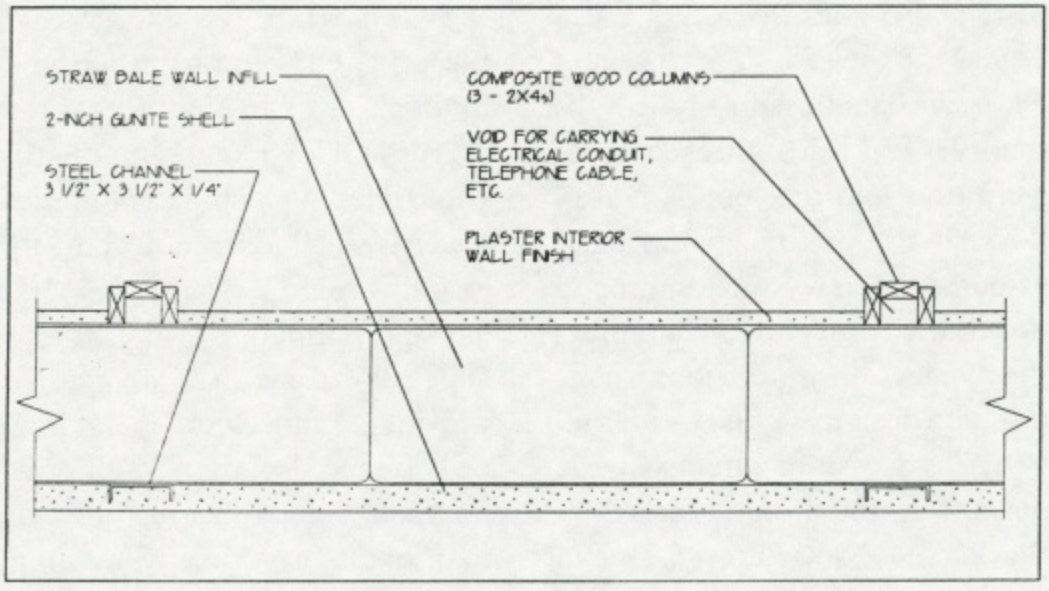
In Cottage 13, lateral forces are transmitted from the top plate (a hefty, lumber-intensive box beam crafted of 2x8s and plywood) to the foundation via crossed diagonal steel straps to resist racking shear. In addition, to counter the compression component of overturning moment, vertical 2x4s span from top plate to bottom plate at the ends of each of these "shear panels." To prevent excessive compression of the walls from vertical loads, threaded rods were run from the foundation up through the box beam top plate assembly. These were tightened down with nuts to precompress the bales beyond the roof's ultimate design live and dead load.

A third case of interest is the design I undertook for Gary Black's structures and construction studio in the spring of 1994. This project, although hypothetical, required an extensive structural analysis. The system I devised combines a concrete post-and-beam structure on the lower floors of the building with a lightweight composite post-and-beam type frame of wood and steel, with straw bale infill, on the upper floors. In the wood-and-steel portions of the structure, lateral loads were resisted by a two-inch steel-reinforced gunite shell on the exterior (shamelessly adapted from one of Gary's designs). Vertical loads were carried by a system of small wood columns at the interior face of the straw bales paired with small steel channels embedded in the gunite shell on the exterior face of the straw bales; these paired columns occurred at intervals of six to eight feet.

Although the scope of this paper does not include a numerical analysis, an (admittedly cursory) examination of the above-described examples suggests to me that, in order to provide satisfactory seismic performance in California, nominally load-bearing designs may entail very nearly as much material as do non-load-bearing designs. Specifically, the



Cottage 13 wall elevation showing lateral bracing (B.Theis).



Plan section, composite wood-steel frame with bale infill.

measures required for code approval of Cottage 13 resulted in the addition of almost as much material as went into my hybrid design, whose objectives did not include minimizing material use. I am confident that with that added objective, this system could be successfully pared down farther.

So, from the perspective of material consumption, at least in severe seismic zones, the difference between load-bearing and post-and-beam may be somewhat academic. I am by no means persuaded that there is a compelling disparity between the two approaches. Furthermore, since the measures required for lateral load resistance also complicate construction, the assertion that "load-bearing" straw bale structures are easier to build is perhaps too sweeping a generalization.

▫ The Qualitative Question

What is the qualitative impact of choosing a post-and-beam, rather than load-bearing, straw bale system? For the sake of argument, I will assume the Nebraska-style system to be the baseline, or desirable choice—from the perhaps questionable perspective of material conservation, but also from the arguably more objective position of requiring less carpentry skill.

The qualities at stake include acoustics, thermal comfort, energy conservation (lower fuel bills), the hand-crafted aesthetic—bumpy walls which express their "bale-ness," freedom from rectilinear form, adaptability and flexibility in placement of openings, and positive construction experience.

The acoustic, thermal, and insulative properties are unaffected by the choice of load-bearing or not. So, probably, are most positive aspects of the construction experience. Thus the qualities that remain to examine are the aspects of aesthetics, form, and openings.

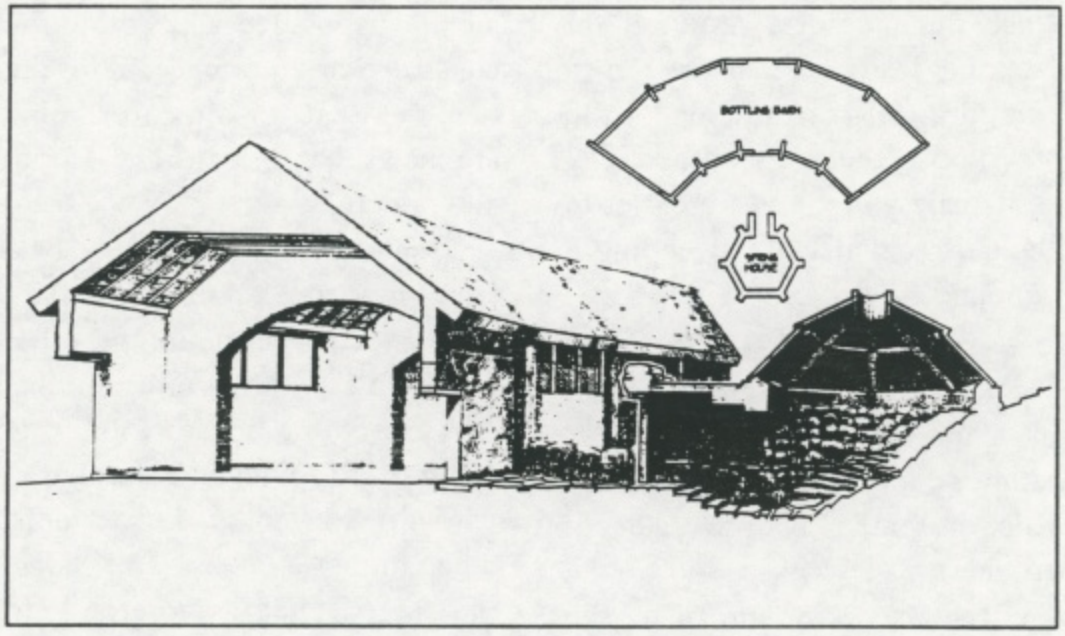
Load-bearing straw bale structures are, for the most part, simple rectilinear buildings, other possibilities notwithstanding. They tend to be assemblies of straightforward rectangular shapes with hipped, gabled, or shed roofs. The forms are, by and large, pleasing and unpretentious. Post-and-beam frameworks afford more aesthetic variability, since the walls are essentially

independent of the roof. Whether that is necessarily a good thing, it would be hard for me to say. My own taste runs toward simple, pure geometries, so I find nothing amiss with the inherent limitations of the load-bearing buildings. Perhaps more significant than the overall form to the aesthetic appeal of a straw bale building, load-bearing or not, is the textural quality of the bale walls, the wall thickness, and ornamentation imparted by niches and other personal touches. These are common to both building types.

Use of a frame undoubtedly permits more flexibility in opening location, size, and proportions. There may be instances in which this is important. It is also possible to combine load-bearing and post-and-beam methods in the same building to capitalize on the benefits of each. Enabling a south wall to be opened up with large expanses of glazing for passive solar heating may be justification for the greater effort and expense of incorporating a frame.

▫ A Case Study

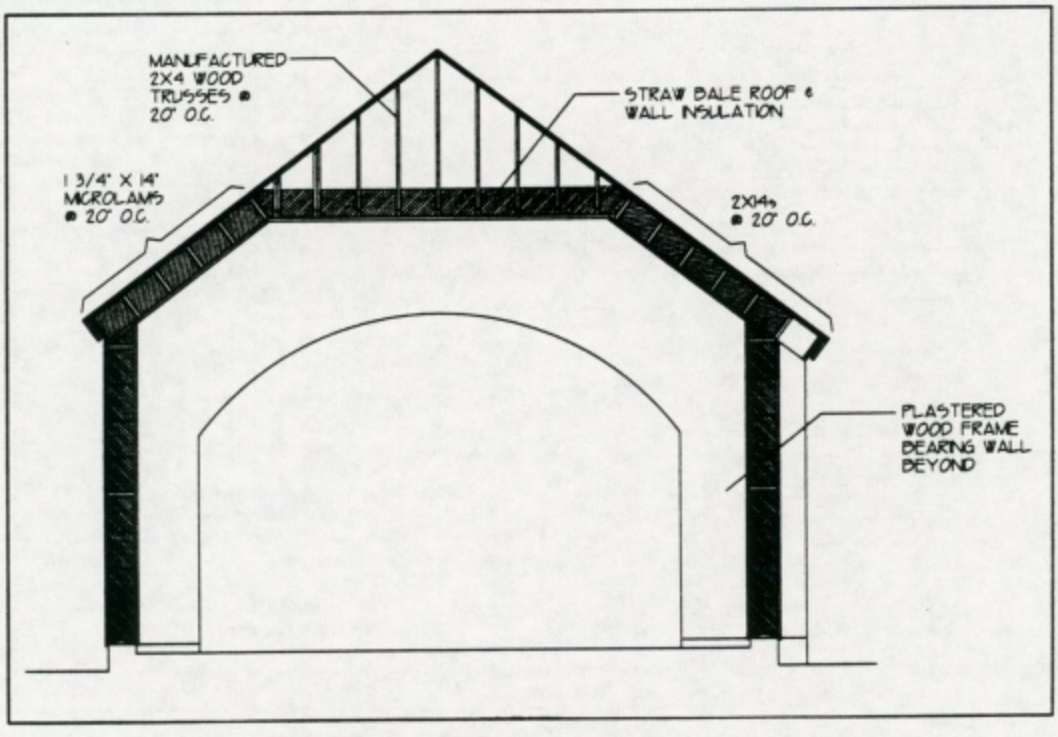
The water bottling facility I worked on with DS&A is an interesting illustration of one extreme of the load-bearing vs.



Perspective section, Idaho bottling facility (B.Theis).

non-load-bearing spectrum. The project consists of a bottling barn and a spring house. The spring house is built of stone masonry. The bottling barn, which derived its complex geometry from a number of site considerations (which are too arcane to enumerate in this paper), is essentially a frame structure devised to accommodate straw bale insulation in both walls and roof. It was deemed not feasible to use the straw bales in a load-bearing capacity because of high snow loads.

The plan of the bottling barn consists of five sections (resembling truncated pie wedges) radiating from the center of the spring house, where the water emerges from the earth. The principal supports for the structure are double wood-framed bearing walls bounding each side of each wedge section. These walls are 14 inches thick, allowing bales (on edge) to be sandwiched in them for insulation. Spanning between these frames are purlin-rafters: wooden I-joists over the outermost third of each section;

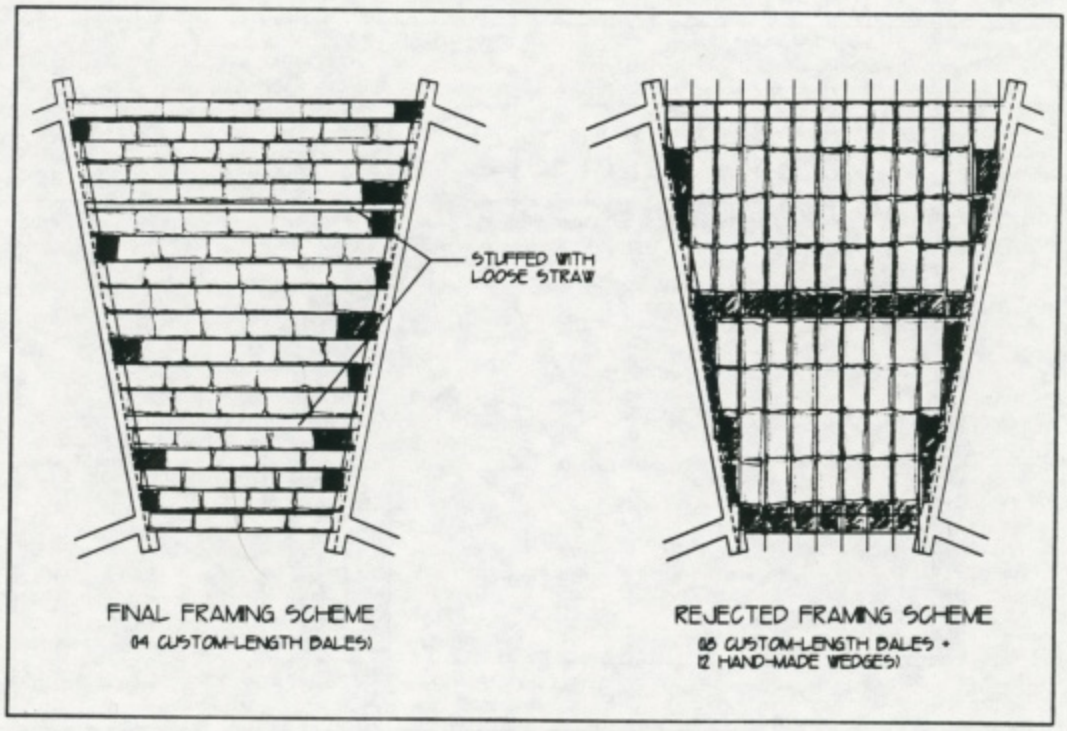


Structural section, Idaho bottling facility.

variable-height custom 2x4 trusses over the center third, creating a dropped flat ceiling area under the gable peak; and 2x14s over the shortest spans, at the inner third.

Shear in the planes of the bearing walls is handled by sheathing the walls with plywood. Shear in the outer and inner radial walls is handled by plywood facings on portions of the straw bale infill walls.

Limitations of material cost and availability, as well as labor resources, were motivators to utilize common dimensional lumber as much as possible for the load-bearing structure. The bearing walls are the armature, or skeleton, which the straw bales flesh out. The use of straw bales for insulation drove the development of the design. For instance, the decision to align the roof members parallel, rather than perpendicular, to the outer and inner walls, arose from the inherent difficulty of shaping bales along their length. It is relatively easy, however, to create custom-length bales.



Bottling barn, roof framing schemes.

The role of the bales in shaping the building is clearly seen in the thick walls and particularly in the depth and configuration of the roof structure. However, the basic building geometry, the five-segmented gabled form, was born of other determinants. The building is still incomplete, and a full assessment is therefore not yet possible. One of the remaining questions is whether building officials will, in fact, allow the straw bale roof insulation to remain exposed, as is the intent. Should that succeed, I believe the exposed bales will have a profound effect on the feeling of the interior space. A conventional ceiling will not have nearly the emotional impact that the straw will. The visible presence of the straw will also help to "explain" the rest of the building.

If the ceiling bales are covered, I am unsure about the final effect of the building as a whole. It will certainly have the thick walls characteristic of straw bale buildings, and a thick roof section. However, because so much of the wall area, although containing bales, is sheathed in plywood, I suspect that there may be some visual confusion about the building's "baleness." (Why are some walls bumpy and other walls smooth? Is that a mistake?) Whether the final outcome is successful or not remains to be seen.

It is clear that the straw bales in this building have not been given full expression in the building's form. It is also clear that this is a highly crafted building that no ordinary, unskilled person could put together. These facts do not make the use of straw bales ***not*** worthwhile. Straw is still a superior insulator; it is still natural, plentiful, non-toxic, and renewable; and it still affords excellent acoustic performance. However, the bottling barn is not otherwise a model for realizing the fullest potential of straw bales in the context of creating buildings that contribute to people's ownership of and belonging to their environment.

The Theoretical Ideal Straw Bale System

A question of consuming interest to physicists, chemists, and other scientists confronting a new material is, "What are the theoretical limits of this material?" As architects and builders, this

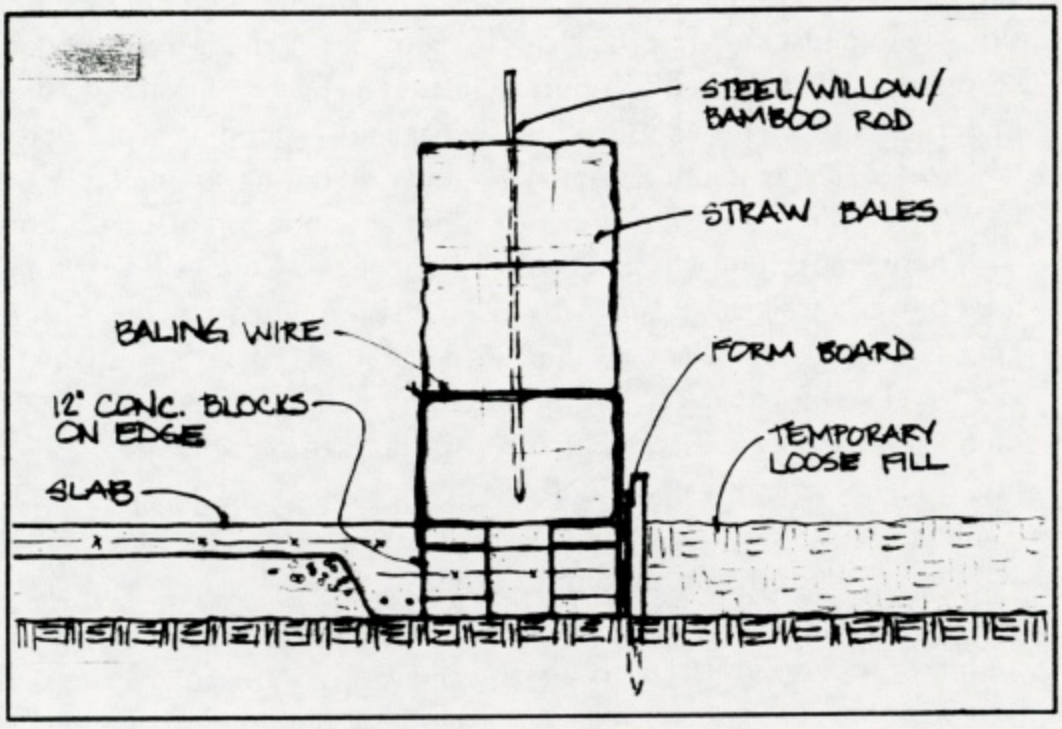
question applies to straw bales. A fledgling organization, the Bale Research Advisory Network (BRAN—"to aid the bale movement"), is now in the process of developing guidelines for structural testing. The results of structural testing will be enormously helpful in advancing the effective use of straw bales in building.

But there are also other questions about the theoretical limits of the material. Perhaps most significant is, what are the limits in allowing people to build for themselves? How can we make it easier still? Some of these answers will be informed by structural test results, but others may be needed to inform the tests themselves.

An ideal building material would not only be easy to build with, it would allow the (owners/) builders to make decisions about the shape of the building on the site. The vast majority of the people for whom straw bale construction offers the promise of an otherwise-unattainable home are people for whom the services of an architect are also out of reach. For most, architectural plans are also not a viable design tool. Even for those with the resources to produce such plans, drawings do not confer the ability to visualize the three-dimensional, full-scale reality. It is particularly difficult to make decisions about siting, views, and other factors that are context-specific, on paper.

The ease of assembling walls was mentioned in the section entitled "Dynamic Opening Layout." It has been suggested that this feature of straw bales might be exploited in the layout of the entire structure. The principal difficulty in implementing this idea lies with the foundation. Since the first row of bales gets pinned to the foundation and must be raised above the soil level, the standard system requires that the foundation be both laid out and in place before assembly begins. There are undoubtedly a number of solutions to this obstacle. Two possibilities are outlined below.

The first, although labor-intensive, is probably the most foolproof and requires the least innovation. This would entail assembling one or more courses of the walls, without pinning, on bare ground (before doing any foundation work) and adjusting until satisfactory results were



Detail, proposed on-site building layout method.

achieved. Practically the entire building envelope could be assembled this way, if desired. Then a record would be made with photographs, sketches, and notes; the wall would be disassembled; and then the foundation, walls, and roof would be built in the normal sequence, with the walls being reassembled according to the recorded scheme.

A second idea (whose details require considerable refinement) is to build up a foot of loose soil on a level area planned for the building site. Then assemble the walls on the soil, adjusting the layout as described above, but pinning the bales together and carefully plumbing and leveling the actual, final walls, complete with window and door openings. Then excavate the loose soil while placing two rows of 12-inch concrete blocks, on their sides, at half-bale intervals under the inner and outer wall edges, aligning the voids of the blocks in the two rows. Securely tie the bottom row of bales to the concrete blocks with baling wire, using a hay needle to thread the wire through the wall. Then place form boards around the outside of the perimeter walls

and pour a slab, filling the voids in the concrete blocks. After the slab cures, excavate a section at a time underneath the walls and backfill with rock to create a rubble trench footing.

There is no telling whether this method is feasible; it may be impossible to create a level slab or level walls this way. It may be more labor-intensive than the first proposal. I offer it in the spirit of a challenge. (Suggestions, anyone?)

The second major difficulty lies in devising a simple, safe method for carrying lateral loads. The extent to which this is problematic varies by seismic zone, but the principles of the solution are shared. What is needed is a system of bracing, tying, or strapping that is easy to handle, stiff enough to resist the compression element of overturning, and can be given a positive attachment to both foundation and top plate. I visualize a cross between conventional chicken wire stucco mesh and chain-link fencing, that comes in wide rolls and can be trimmed to wall height; or lightweight steel lattice panels, similar to cheap garden fencing. A solution might employ some combination of common materials such as chain-link fencing, heavy-gauge reinforcing mesh, diagonal strapping, or vertical rebar spanning at intervals from foundation to top plate. Or it may be that the Cottage 13 system of steel strap cross-bracing with 2x4 panel end posts is actually the simplest solution. This, too, warrants further research.

▪ DS&A Team Proposal

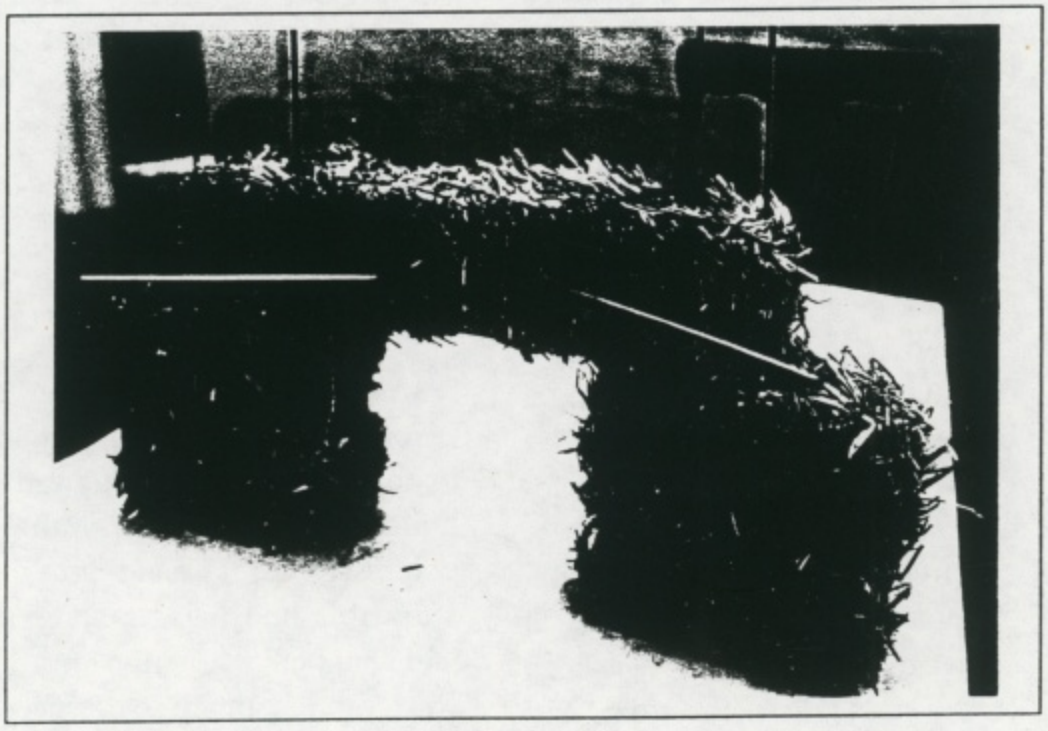
Another approach is to build forms that are inherently structurally sound, such as domes and vaults. Vernacular examples of earthen domes and vaults exist around the globe, many of them still sound after standing for centuries. This is the approach under investigation by the DS&A competition team.

Promoted by the Japan Design Foundation, the 7th International Design Competition, Osaka, has a theme of "touch, feel." Part of the call for entries reads "...progress has not come without sacrifice, as we have gotten farther and farther away from our very own human nature...It's time for us to reflect on our ways of being and do something to bring out our human nature, to bring back the 'touch'...there surely must be

something in a design that can work for the benefit of all living things on Earth."

The DS&A entry proposes a complete straw bale building system—both as a viable way for even unskilled, low wealth people to create their own homes (and thereby reconnect with their human nature) and as a building material/method that "touches" primal chords due to our legacy as a species that evolved in grasslands and that still depends on agriculture for its survival. The system employs straw bales not just for walls but for roofs—hence a "complete" system. An experimental vault is presently under construction to test the wedged coursing method described earlier, under "Shaping." If successful, this technique will make it possible to build the entire structure using a single material and simple method. This is an exciting prospect.

Among the details developed for this system is a simple method of spanning window and door openings. Openings are limited to



Bale header mock-up.

one bale width, and two bales meet over the midpoint of the opening. Vertical pins are driven through the outer halves of these bales into several courses of bales below. They are then pinned to one another with two pins in a horizontal "X." Then baling wire is looped around the vertical pins, around and under the "header" bales in figure eight fashion, catching the protruding ends of the horizontal pins, and finally tied off to itself after completing the circuit. The ends of the horizontal pins are bent back flush with the bales.

This is one among many details that have been devised to simplify bale building. There are certainly other aspects of designing and building with straw bales that bear simplification. Many of these are being refined as a natural byproduct of builders' ingenuity as they acquire experience with the material. Fortunately, many innovations are shared via The Last Straw, a newsletter for disseminating straw bale construction information. Resolution of still other straw bale owner-builder issues relies both on the acquisition of test data and on persistence in the face of bureaucracies. For instance, the question of how to get a building permit without plans or calculations is a perplexing one. Some jurisdictions will grant permits retroactively, provided sufficient information can be produced to demonstrate adequate conformance to codes. Those venturesome enough to attempt building without a permit would do well to keep meticulous documentation along the way: journals, sketches, building material receipts, photographs, etc. I hasten to add that I don't recommend this route, as building codes and permits safeguard project workers, inhabitants, and the public. All attempts to obtain permits for straw bale structures will also further the cause of the method's ultimate acceptance and dispersion.

Whither From Here?

All of the issues described herein, and many others, will have to be resolved for straw bale building to achieve its optimum potential for providing truly affordable housing. I believe this will happen, although perhaps with varying degrees of success. Even those who concede that

building with post-and-beam frames solves many problems seem to do so reluctantly and acknowledge that this method, too, has shortcomings. The passion for building "Nebraska-style" stems from its accessibility, and there is a constant tension between the drive to build with straw bales in this simple, uncomplicated form, and the need to satisfy code requirements. While there are those who adopt an "Oh, just ignore the building official" attitude, there are many others who are dedicated to conducting the rigorous experimentation and testing needed to make this method more accessible still.

A Personal Assessment

After acquainting someone new with the idea of building with straw bales, I am often asked, "But...would *you* want to live in a straw bale house?" The answer is a resounding "Yes!" It is a particular irony that, as I write this paper, my furnace has been blowing hot air almost continuously, day and night. Well, it's winter; what's wrong with that? It's winter *on the California coast*—the mean temperature here, year-round, is 60-something; yet the heater has to be on at two o'clock in the afternoon. Admittedly, the house could be better insulated, except that we can't afford to do that (because we live in the Bay Area, and the house payments are too high...well, you get the idea). Oh, to be snug in a mortgage-free straw bale bungalow...

I am very enthusiastic about the promise this material holds, and look forward to seeing its future unfold. I have both enjoyed myself and benefited tremendously from working on the Idaho project these last few months. Now I can't wait to work on a straw bale house project. I welcome calls or letters from anyone sharing my interest.

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Achieving Reality in a Playground Towards A New, Integrated Process Of Design And Making

Sean H. McPherson

In the following paper McPherson describes a highly dynamic way of designing and building a playground. The process which is followed differs conspicuously, from a more static process where design is done on paper. In this example, we see the use of physical techniques which guarantee the reality of what is achieved, and which do not allow conceptual solutions to dominate.

The process involves the use of abandoned tires as mockup materials. These tires, cheap, safe, and readily available, allow the playground to be designed by an ongoing process of experiment, at the full scale of the real environment.

The paper compares the living character of the new playground with the relatively more dead character of the "designed" playground, and comments on the aspects of the process which carried most weight in giving life.

At the end of the paper McPherson discusses, speculatively, ways in which other larger building projects might be designed by similar methods.

What is most exciting about this paper, is the profound way in which it uses reality, to generate reality. The drawings, models, of the playground which were used at first are thin, and by their nature continue the alienated kind of unreal environment which 20th century city dwellers suffer from. The real simulated playground, made of tires, and allowing children and parents to observe, modify, correct, invent, and then perfect the playground as it is actually to be — that is a kind of reality, profoundly adapted to real conditions, profoundly adapted to the real material, real place, real feelings and actions of the children.

It is this, which embodies the "belonging" that these studies are looking for.

What matters is this: Can we find comparable ways of making larger projects, buildings, apartments and so one, so that these insights can be extended to produce this living reality at a larger scale?

The Question Of Process In Design

The standard process for design taught in professional schools of architecture places great emphasis on the creation of aesthetically pleasing graphic and plastic representations of what is to be built. Although various degrees of examination of the site are attempted in the so-called design stage, in general the working drawings and model are adhered to as faithfully as possible during actual construction.

This process is efficient in that it responds well to the need for documentation for permits, as well as the need to have an accurate idea of where the budget will be expended.

However, such an approach does not allow much room for on-site changes stemming from new realizations garnered during the building process. The standard process also does not allow for the shifting of money to different areas of emphasis - it is very inflexible. Perhaps worst of all, however, is the effect this process has on the seminal stages of a project. By following a system that prioritizes regulatory and budgetary clarity and efficiency, the importance of the relationship to the actual site is greatly diminished. Such a process, by focusing undue attention on representations of the site, most commonly produces structures that are not appropriate to the actual site. The separation of design from the actual making of the thing, as well as the absence of a dynamic relationship between these two processes and budgetary considerations, can not lead to good architecture.

A Process For The Creation Of Playgrounds For Young Children (6 And Under)

The making of playgrounds for very young children presents unique problems of design, as well as archetypal design problems faced in projects of much larger scale.

Among the most essential of these problems is common to all design- the question of user needs and wants. Children are at once easy to please and enigmatic clients. Parents' ideas concerning playgrounds are also highly image-oriented, driven largely by existing commercially-made

models. Fundamental to the making of any good playground is a clear understanding of the nature of children's play.

The second question is the critical nature of site. Limited budgets, as well as the very nature of playgrounds themselves - small structures organized upon a landscape - both demand the deepest understanding of the site, as well as the greatest exploitation of the site's existing structure.

Review Of Other Processes Commonly Used To Create Playgrounds

Various processes have been tried to make playgrounds for young children. The purchase of commercially available play equipment chosen by a committee of officials and parents is the most common approach. However, far more interesting for our purposes are the various community-based, or participatory design processes. Community-built playgrounds profess to have at their core the active involvement of the users both in the process of design and construction. Aside from the difficulty of mobilizing relatively unskilled volunteer labor and dealing with common problems of material procurement and funding, these processes all have a difficult time dealing with the process of citizen participation in design. The difficulty of communicating in model or drawing to people relatively unfamiliar with such media, the isolation from the site often engendered by such approaches, and the problem of attracting people to the design meetings and charrettes all contribute to the difficulty of coming up with a design that is responsive to user needs and truly works well on the site. These processes that rely on graphic and model presentations strike us as too separate from the site and the process of making.

Outline Of Our Process

We propose a process that gets at the heart of the fundamental questions of playground development. How will children really play in the proposed playground? What latent factors in the site must be intensified and exploited? How will the equipment actually be used by the kids? In essence, the process consists of a close examination of

the site and interviews with users on-site. A rough mock-up lays out basic spatial divisions at full-scale on-site. A rough design is generated based on this feedback and on-site layout experiment. This relatively simple mock-up is succeeded by a mock-up sturdy enough to be used by children, yet simply built so that portability and flexibility are not a problem. Users are encouraged not only to try out and comment on the existing layout, but also to change things as they see fit. After starting with the null state, or initial design, the layout is changed according to the feedback, input and work of users (adults and children). After significant changes, the scheme is frozen long enough to record it accurately. The final construction occurs incrementally, building upon the existing temporary structure.

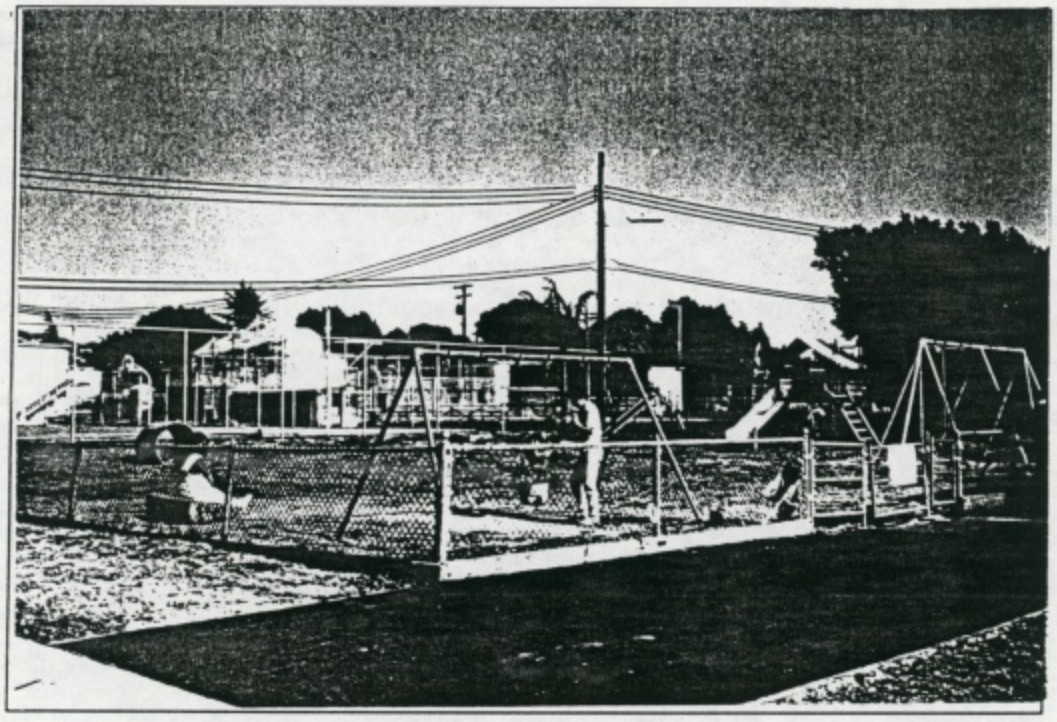
The Seminal Process At Uc Berkeley Married Student Housing

▫ Site Observation and Identification of Existing Centers

The process begins with the close observation of the site to identify existing centers. In our project this generated the diagram below. Although the existing playground seems a relatively barren, unkempt area defined only by a chain-link fence, observation of patterns of use revealed a complex and fairly well-defined structure. Major centers surrounded large pieces of equipment such as the play structure, areas where people outside and inside the park interacted, sitting areas, and topographical features of the site such as the low, wide mound roughly at the center of the playground. We decided to try to intensify the existing centers rather than trying to destroy them by moving pieces around and completely changing the topography.

▫ User Feedback

Next we elicited feedback from potential and current users of the space via on-site interviews and a questionnaire. The questionnaire asked basic questions concerning problems and wishes for the park. It also asked respondents in what way



Existing site..

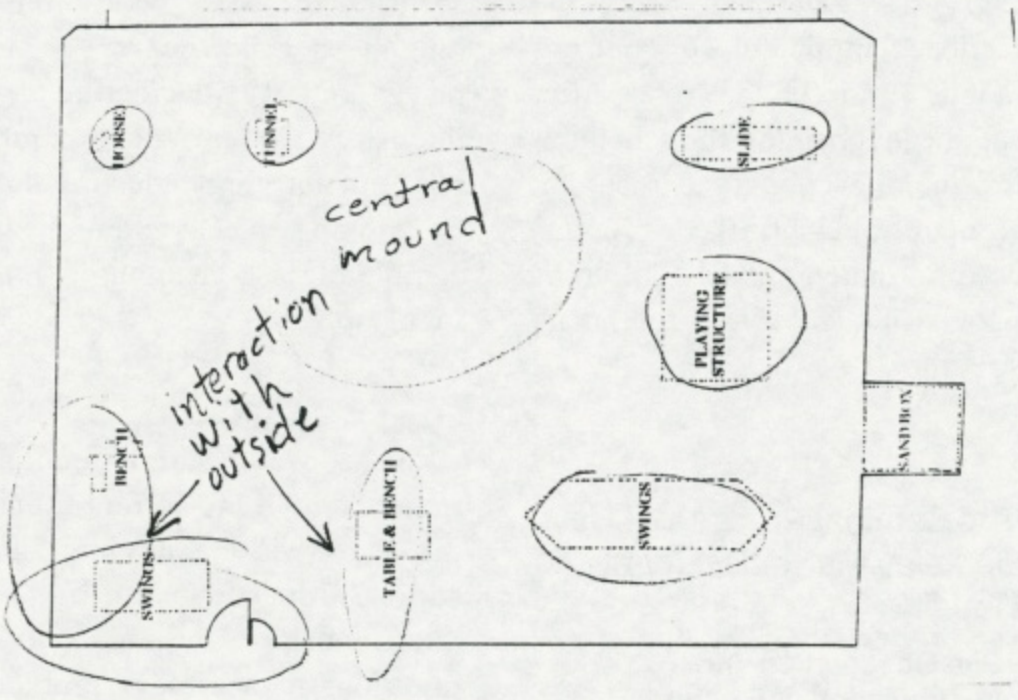


Diagram of existing centers.

they might be able to contribute to the rebuilding of the playground. The questionnaire was distributed both on-site and at the Village Festival, an annual celebration that occurs next to the site and attracts many children.

A brainstorming design session on-site followed. Adults and children drew and painted their images of the new playground. Both the childrens' mural and the adult plans pointed up widely similar failures of the existing park, as well as desires for the new park. The most widely cited problems were a lack of shade,

Children at work on the mural.

HELP MAKE MONROE STREET PLAYGROUND BEAUTIFUL!

A group of student residents invites you to participate in the rebuilding of the Monroe Street Playground. We will make this playground a beautiful and life-filled space for the enjoyment of parents and children in the Village. However, we need your help.

We will hold a couple of workshops at which your participation as parents, residents and users will be vital. These workshops will be held on-site on weekends. We will begin construction this semester, with the help of other resident volunteers.

We will meet next from eleven to one o'clock on Sunday, September 25th at Monroe Street Park. Children and parents will paint and draw their impressions of their new playground. Please bring your children.

Please take some time to answer these questions.

What are the main problems of the playground?

What elements would you like to see in the new playground?

What are you willing to do for the playground?

- ☐ Help with construction
- ☐ Donate money
- ☐ Participate in a bake sale or other fundraising activity
- ☐ Donate materials
- ☐ Other (Please specify)

When would be the best time for major construction?

- ☐ Thanksgiving weekend
- ☐ Weekend after final exams

Name:
Telephone:

See you next Sunday!

First questionnaire.

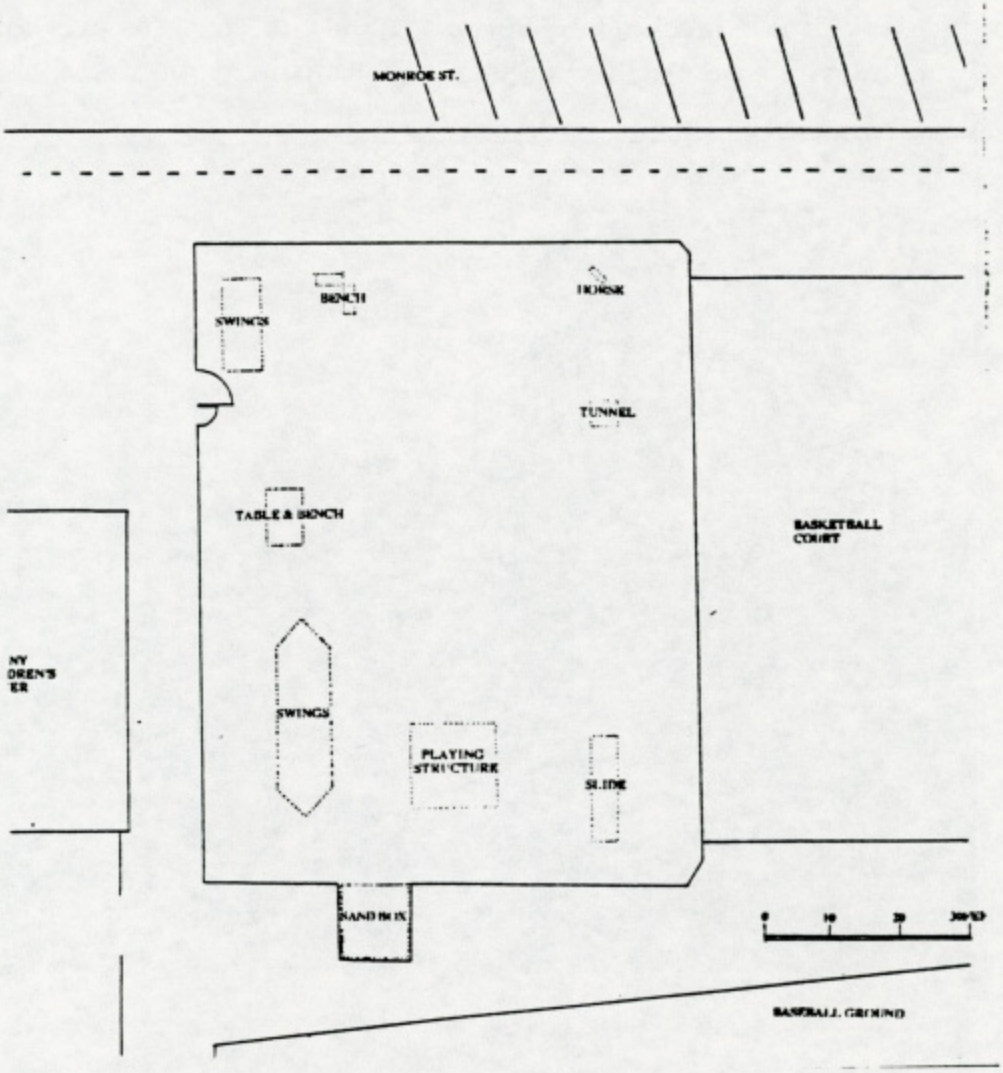
Let's Make Monroe's Playground Beautiful!

Your Name: _____

Tel. Number: _____

Address: _____

Write a short description, draw an image, or draw a plan of the playground as you wish it to be.
Mention existing problems as you see them now.

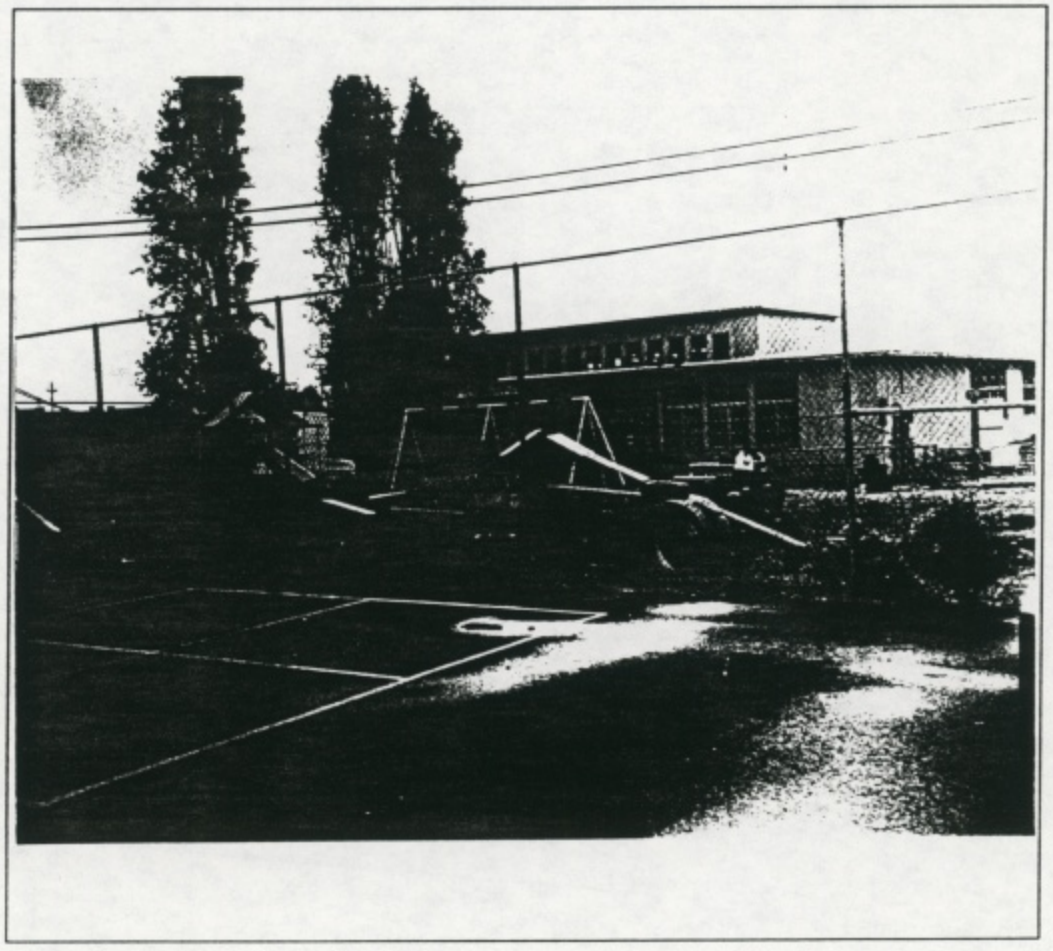


Questionnaire used at first group event.

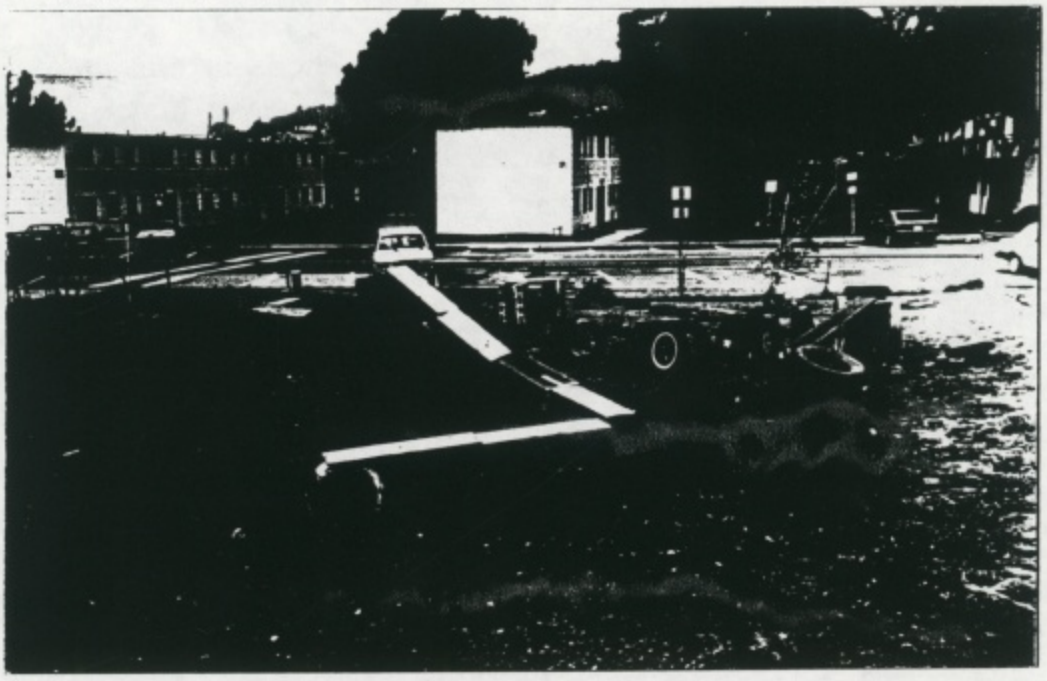
sitting areas, structures for older kids, and a sandbox.

▪ First Mock-up

A rough mock up responding to the existing centers followed. (see photos below). A circular structure intensifying the central mound as a center was the main discovery of this mock-up. This structure would be used not only to intensify the mound itself as a center, but also to intensify the surrounding centers by connecting them to to this central structure. A distinct toddler area along the street edge of the site, flanked by a covered seating area for parents, also emerged from this experiment. Unfortunately, in response to concerns over safety, we dismantled the first mock-up



First mock-up.



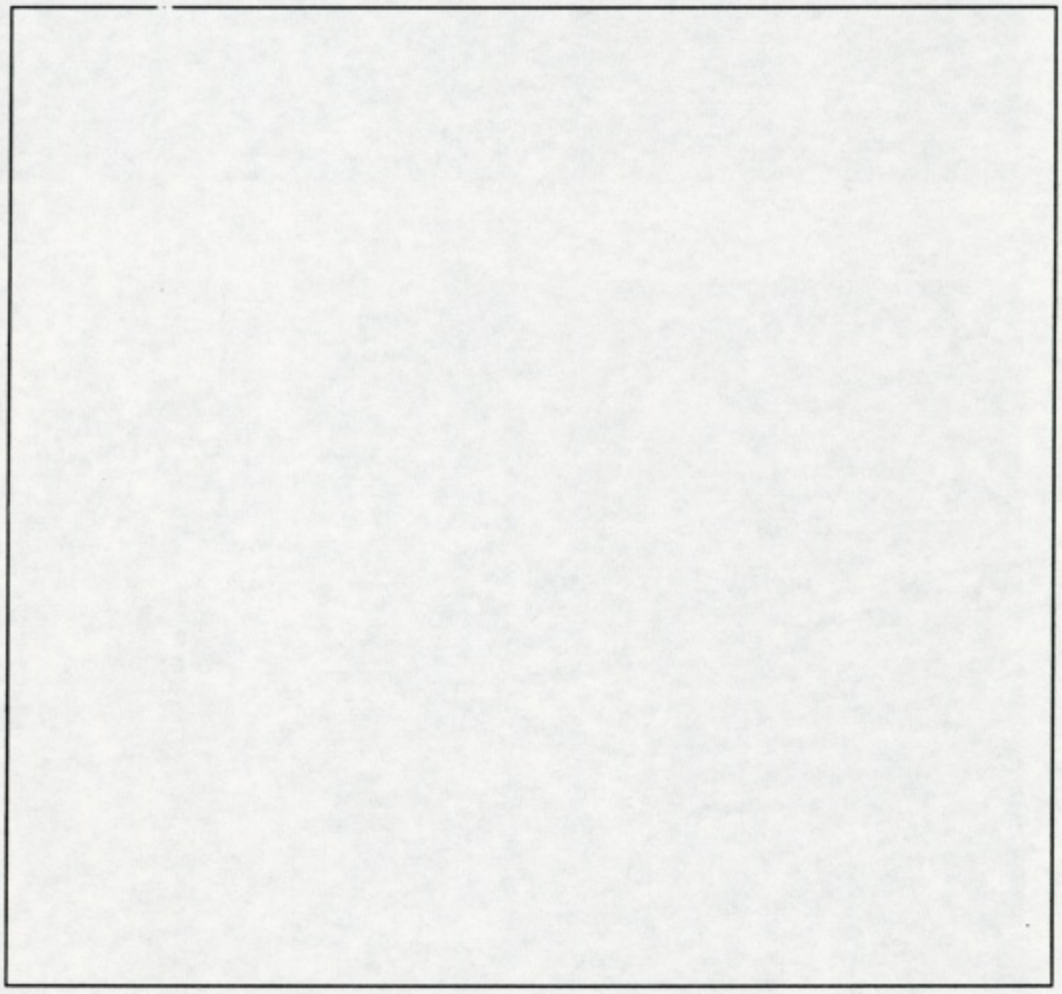
Circular structure with central tower.

Parents' trellis (left) with toddler area.

before people were able to interact with it very much.

▫ Back to the Drawing Board

The process was derailed at this point by a return to the traditional design process. The photo below shows a model produced in response to pressure to have a model for publicity purposes. The model is well-finished, but discards some of the fundamental understandings of the site achieved by the mock up process. Several of the structures pictured in the model actually do not work in the site at all, though they do look dramatic in the model. The clearly defined circular structure of the first



Model — looks okay, but not very true to actual site.

mock-up has also disappeared in the model.

▪ Second Mock-up and Active Modification

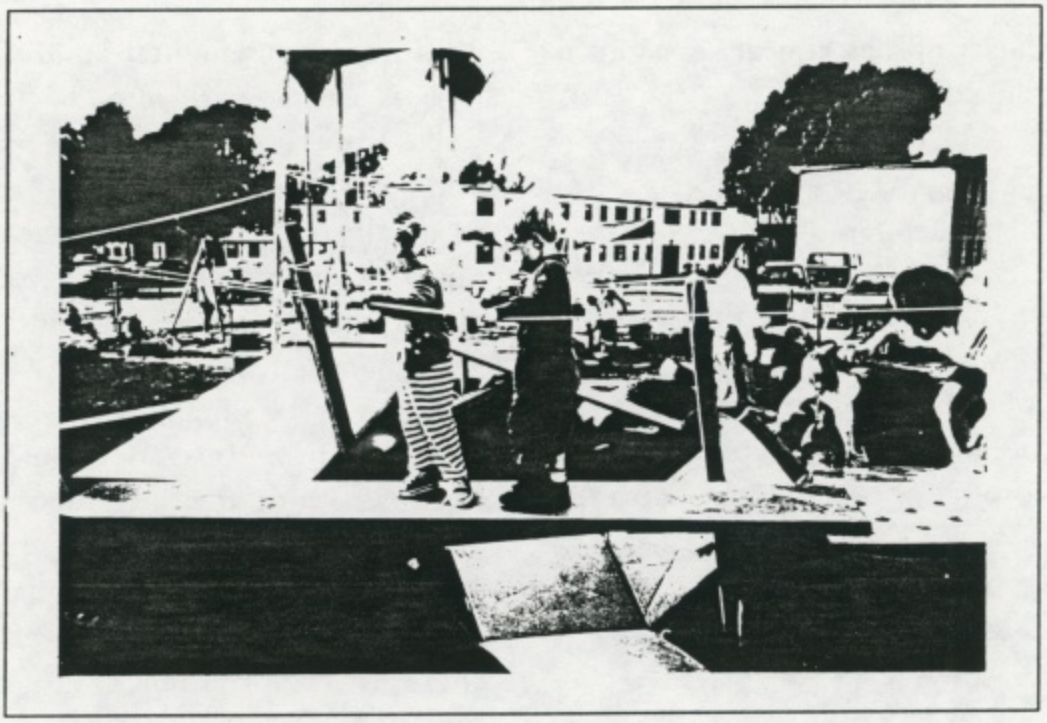
The next step was a full-scale, usable mock-up of the proposed design. Discarding the model, we went back to the understandings of the first mock-up and started afresh. The followings photos and

Kids helping to build

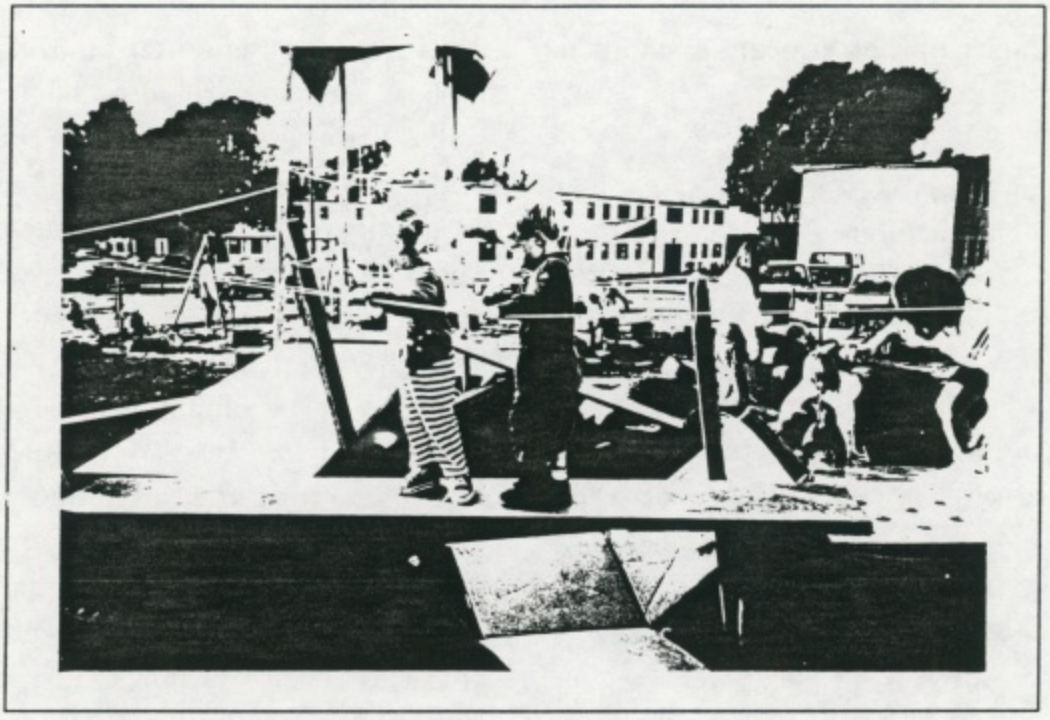
measured drawings show the evolution of the design worked out on-site.

A realization that the retaining walls were the most important elements of the design led us to push for an incremental building process starting with some of the walls. It was essential to leave the temporary structure standing so as to modify it in reaction to new understandings of the site, as well as to simplify the layout of the permanent structure. We had difficulty maintaining our momentum as busy schedules interfered with the incremental building process, but the importance of this mock-up can not be underestimated. The very physical fact of the mock-up not only spoke powerfully to the users of our earnest desire to build, but also amazed the timid bureaucrats who oversee things in the housing complex. Administrators were far

Central tower



Exploring



Exploring

structure can tell us in part to what degree the finished project contributes to the wholeness of the place, to what degree it is used

Path made by children.

and appreciated by both kids and adults. The basic structure of the playground, the way the walls respond to and link together the site, the location of gathering places and vantage points, the placement of new trees and shrubs, the routes of movement created by the structure all sprang from and were modified according to work done on-site. The dynamic patterns of movement through the space along a path composed of both walls and structures are a result of observation of the paths consistently recreated by kids using the space and modifying the tire walls to form an unbroken route through the playground. A process divorced from the reality of the site would have been far more likely to produce a solution such as leveling the central mound to put in a sand area.

All of the elements mentioned above also had the advantage of having been seen in mock-up form by most of the everyday users of

Existing cylinder made accessible

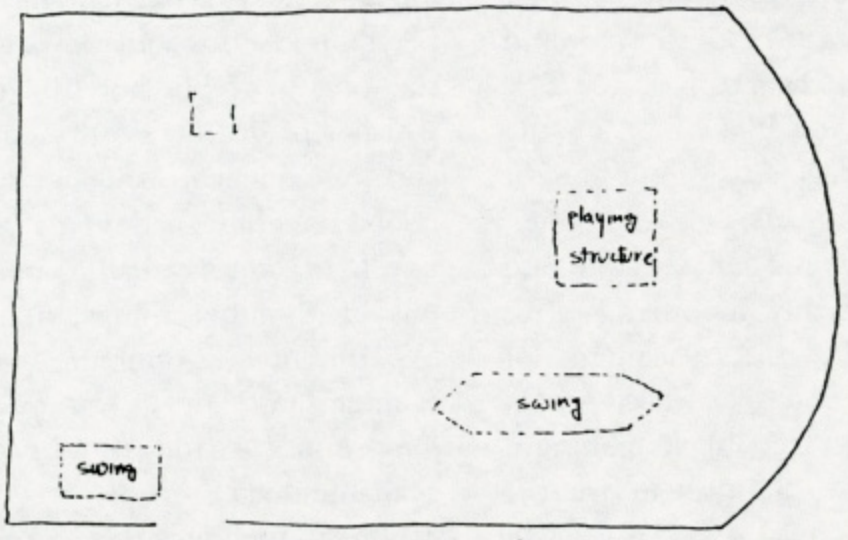
LET'S MAKE MONROE'S PLAYGROUND BEAUTIFUL

During this weekend we have tried to simulate the future construction of the playground. The structures that we have built are temporary and are aimed at exploring the use and the placing of the elements.
Your feedback is very important for the actual construction. Please consider the existing structures that are now in the playground and evaluate them.

1. Make a simple sketch of the playground as you have found it today.
2. Evaluate the playground as it is now_____

3. What changes to the existing structures would you like to see?

Thank you for your help
and hope to see you on the construction day.



Name:_____Address:_____Tel. number:_____

Questionnaire used during second mock-up

the project. Hence objections from regular users were rare.

Notes on the General Applicability of Our Process

How might the lessons of our humble, volunteer-built playground apply more generally to architectural projects on a larger scale? The control of the budget - the freedom to spend the available funds where we deemed fit - is an important advantage in a project of any scale. We insisted on complete control of the budget in order to give us the greatest freedom during the building process. The lessons learned from the mock-ups, important facts not well-grasped in model form, would benefit projects at any scale. The insistence on flexibility at the building stage also would benefit larger projects. Although foundations and concrete walls are not realistically modifiable after being built, the placement of windows, interior walls, stairs, level changes, ceiling heights, and all elements of finish in a larger project such as a building will benefit from such a flexible approach. In the light of the changes that occurred on such a small project, one might reasonably assume that the number of realizations gained on-site would increase dramatically for more complex structures such as multi-story buildings. The failure to follow such realizations as they become clear on site leads to the failures that make up the bulk of our built environment today.

Thoughts On Community Participation In Design

Although of less general architectural interest, many issues peculiar to community-built projects slowed us down. The ongoing story of our making of a playground ebbs and flows with the breath of life and the cold whisper of death. As the day to construction nears and our labor pool is uncertain, certain materials unsought or unavailable, people busy with other things, needed experiments undone, our momentum slows even as the long-sought funds become available to us.

But thoughout our tale runs a consistent thread of truth; at times ignored, at times recognized, at times acted upon. This truth is the

complete assumption of responsibility for our own actions. When we took responsibility upon ourselves, completely unexpected things happened: I was able to locate materials seemingly out of thin air, people came to help, the seemingly insurmountable obstacles thrown up by nervous administrators were overcome, our own fears of kids getting hurt remained simple paranoia.

This central fact seems obvious and insultingly simple, but it is absolutely at the heart of everything that has happened with this project. The assumption of responsibility was the initial spark for the project, and all of the obstacles that have arisen sprang ultimately from our refusal to take responsibility for our own actions in a deep moral sense.

What is most disturbing about this fact is its pervasiveness. The indifference and opposition of administrators and maintenance supervisors to our project was far less of a problem than the well-meaning, but misguided efforts of members of our team on this project.

I had agreed to work with three quite experienced architects, all of whom were very interested in the concept of community participation, on the condition that "we are making a playground, and we accept complete responsibility for that commitment." Regardless of the number of people who chose to join us in our efforts, ultimately the responsibility had to be ours alone.

Working is this group was very difficult for me, not least because of my own insecurity at my lack of experience and competence in comparison with my colleagues. There was a constant tension in our meetings, a tension that existed in spite of numerous agreements and no shortage of good will on all sides. I was bothered most by my sense that for my colleagues this project was simply a vehicle in which to carry out their intellectual interpretation of "community participation." As traditional design professionals divorced from the realities of making, my colleagues seemed most concerned with participation in the "design" phase. Unfortunately, this participation seemed to entail subjecting everyone to the same excruciating process of design architects today suffer through, rather than coming

up with a process more meaningful to ordinary people. The casual and enjoyable painting session we had at the park would have, at my colleagues' hands, been a full-blown 'design charrette' with an explanation of "design factors" by one of us at the beginning, followed by the creation of plans by everyone, followed by discussion and distillation of the completed plans into a final plan to be agreed upon by everyone. A process so divorced from the realities of the site would have failed miserably, not least because of the tremendous diversity of the park's users, few of whom are native English speakers.

Two meetings for "fundraising" and "construction" volunteers failed miserably. People simply were not interested in coming to a meeting so divorced from the actuality of the site. The atmosphere stank of a bunch of tired grad students coming down to crunch time and looking for someone on whom to fob off the necessary work. The whole tenor of the meeting was to organize people to do our work. The poor attendance at meetings such as this stood in stark contrast to the spontaneous enthusiasm and assistance of people at our mock-ups.

The destruction of the first mock-up came from my own fear of the consequences of what I had done. The feeling of regret as we tore it down, all that work for nothing, myself working almost in a frenzy to dull the nagging feeling that we should just leave the damn thing out there. The overreaction to my boss's skeptical comment and the fears of my friends that some kid would get hurt. The sense of embarrassment at the foolhardy amateurishness of the whole thing to my more experienced colleagues. The sense of fear as to whether or not kids would really like it: hey, how can you know without trying it out?

Our group's messages to the public were also very troubling. There was usually the implication that our group was ready to direct other people to do things. Seeing others as the agents to actualize our willful egotism could not generate much enthusiasm. Our intellect tells us that the involvement of people in their communities is a good thing, we then look for a way to make that happen, a mechanistically reliable

set of steps that we can undertake to make this process self-perpetuate into other projects after our own. The idea that we organize people to do something - they will serve us: one way or another it seems to come back to this problem.

The first letter written to our director to officially ask for funds repeated this fundamental mistake of representing ourselves as organizers of workers rather than as makers of a playground. I could not recognize my own project in the letter that purported to explain it to our director. The letter put the cart before the horse. It stated our goal as the increased participation of residents in affairs of the the Village, when I had made it clear that our goal was the making of a playground. The realization of the broader goal of community participation will spring only from the relative success of the making of our playground, a task which will take all of our energy to successfully complete. "We", or at least "I" am not a group that wants to direct people to build a new playground. We are a group that is building a playground. We are the residents and the users. The problem in unsuccessful community design projects is that the impulse comes from above. Like many architects today, you can study until you're blue in the face how best to effect change from the top, but you'll never get around the fact that real volunteer action just doesn't come down from above. It comes from people taking responsibility for their own lives and actions. We cannot direct other people, especially volunteers, to do that. We can only inspire other people to help in our efforts by setting an example of the kind of selflessness we might hope for from everyone at their best.

The egolessness that we strive for is powerful, significant not only because it permits us access to a realm of beauty, simplicity, rightness rarely attained today by design professionals, but also because a human being acting in that mode exudes an aura that cannot be ignored. A human being doing something of his own free will, especially something for others, is simply a powerful spiritual presence.

When we truly do something out of our hearts for others, we do the most for ourselves. When we

do something that is in the deepest sense personal, we are acting also in the realm of the universal. Action in that realm has the greatest capacity to touch other human beings.

So selflessness, listening deeply to people's desires and needs, offering one's labor without love of money or fame are at the core of community-built projects. All of these are ultimately arisen from the assumption of personal responsibility for the environment that can come ultimately only from each individual.

Final Notes On Process

To come full circle, we must point out once again that the most generalizable elements of our process - the emphasis on site-specific, usable mock-ups, design flexibility in response to the emerging reality of the built project - are those that also are most effective in a community-built project. A process that focuses on the real site will always generate richer solutions than one based on the rarefied representational tools of the current design profession.

A proposal for a new hybrid masonry construction unit

Eileen Tumlin

In the next paper — the last in this volume — Tumlin describes a simple and practical way of making "ornamental" concrete blocks. Her work started merely with the desire to make it possible, cheaply and efficiently, to build concrete block buildings with a variety of meaningful ornament. She describes a simple practical and efficient technical method of attaching ornamental castings to the present form of 8"x 8"x 16" two core block. The available ornaments include cornice moldings, corners, ornamental panels for mid wall positions, and window and door surrounds.

The technical invention is impressive, because it is so simple.

But the real worth of this paper, and of the ornamental blocks which Tumlin describes, lies in another, deeper sphere. When we examine the kind of transformation of an ordinary block building, which is achieved by adding these ornamental blocks to it, the transformation is startling and clearly beneficial, for a small outlay of extra cost. But what is most remarkable, is that one grasps the possibility that the construction of the building becomes meaningful, as a process, and that the provision of the ornaments provide just those "anchor" points, which allow the work of construction to become a meaningful unfolding, in which feeling and human desire enter into, and then transform completely, what might otherwise be an antiseptic, ordinary building. Thus the meaning of the ornament, is not ultimately in its ability to make the building more pleasant to look at, but because it transforms a potentially alien mechanical building, into a thing which is loved and cared for while it is being made. That is something which transforms the building utterly.

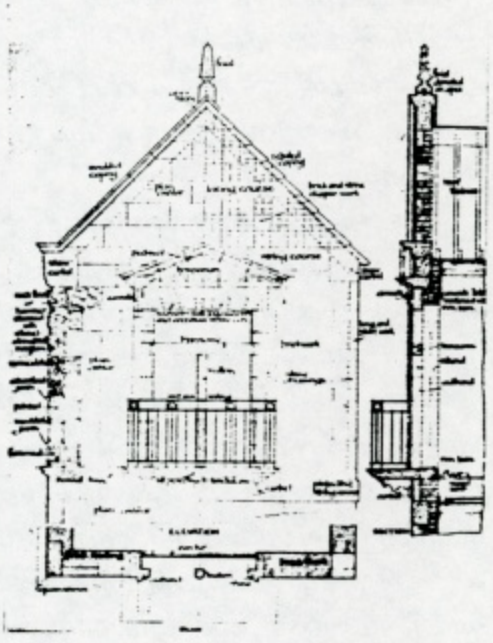
So the importance of the ornamental add-ons, is not that they ornament the building, but that they provide the possibility that the building can be created through centers, boundaries, edges, and that because of this, the building can be made personal, and can be given heart.

Introduction

In the following article I investigate a project that I feel can have a real impact on the making and the experience of buildings. It is actually a challenge to do something so simple as make a good wall when the priorities of our culture consider cost and efficiency the primary generating forces. While studying architecture at Berkeley I have wondered how it might be possible, within the current state of the building industry, to actually have a real and satisfying effect upon the built environment after I graduate. The context of the Atelier taught by Christopher Alexander this semester offered the perfect opportunity for me to make just such an exploration.

For a number of reasons, I have chosen to work with the concrete masonry unit construction system to conduct this investigation. It is rare for this particular material to create buildings with life yet masonry construction systems do have a history of yielding very beautiful results. While it isn't currently the case, I feel that there can be a way in which concrete masonry unit, or CMU, construction can actually produce buildings with a great degree of wholeness and feeling.

In two previous studios, I have chosen to use a concrete masonry construction system combined with pre-cast ornamental units. My own experience and interest in sculpture has fueled this interest



Traditional masonry wall elevation and section

in finding a way to integrate sculptural or decorative elements with a construction system. The emphasis in this project for the Atelier has been on developing a method of fusing these two aspects in a way that recognizes

our contemporary construction and manufacturing processes.

The significance of my proposal is in its capacity to help CMU become more alive. Perhaps even more crucial is the way in which my method proposes to do this. It plugs into and enhances a construction system that is firmly in place and popular for its low cost and availability rather than trying to propose an entirely new manufacturing process or type of CMU. My hope in developing this hybrid building material is that CMU will continue to be used and that my product will enlarge the possibilities for creating beauty with this method of construction and within the physical environment in general. An even larger hope is that the use of CMU will increase as a direct result of the new possibilities created by the hybrid blocks and that they will enable the production of relatively inexpensive structures that are beautiful.

I begin by imagining what the world might be like if my hybrid block were actually available for use. What would the impact of such a simple little thing actually be? In the most ideal situation, how would a small thing like the hybrid block affect the real world? From this vision, I hope the worth and the value of pursuing my proposal will become apparent.

My Vision For The Future: A Memory Of Deeper Connection

I imagine a future in which it isn't terribly expensive or difficult to make a beautiful building... a building that is rich with variation and full of centers...a building that is pleasing because it doesn't deny the need for human resonance with the material or physical realm of reality. I see a future that has a renewed sense of value for this type of harmony in our built environment because of the availability of a simple building material that complements an existing and widely-used construction system.

But how exactly will this happen? How will this shift come about? What specific steps need to be taken to bring about these changes in priorities? Is it something large and forceful or is it something humble and inconspicuous that will help to

remind people of what they really need and want?

It can be a quiet thing... something simple and apparently insignificant. It can come about as a result of the availability of a specific unit that can be easily added to the common system of masonry construction without disturbing this system. When people see how easy it is to make such an impact on the walls and buildings they are making, they will be surprised to feel the connection that had been held captive for so long by a reality that doesn't value beauty or soul... especially in a building made from such an efficient material as the concrete masonry unit.

When people feel this part of themselves awaken, they will decide to make a shift in their priorities. They will begin to realize the importance of being able to feel connected to and passionate about their environment. From a very small thing, people's eyes will begin to open up. They will be reminded of something that had been buried deep inside of them for a long time... a memory of the way in which they had once been able to feel part of everything around them. It is a memory of a need for beauty and meaning that had been collectively forgotten and deeply embedded. They will be reminded of the importance of this deep connection and the need to make it again.

We All Want Something More

For me, this means connecting to the way I feel when I am with a thing. If I have to live with a wall, I will want it to be as beautiful as possible. I will want it to feel as much like me as possible. The same is true if I am making the wall myself. If I am actually doing the work, laying each block, I will want to feel the same closeness with the materials. I have had the experience of making a concrete block wall in which we constructed an arched opening. I spent time with a partner placing he CMUs in various configurations and then actually constructing the wall. We cut masonry units with a band saw and cast special elements to create the arched window opening. From this experience, it occurred to me that there was a potential for a system that could do more than what the CMU system alone was capable of.

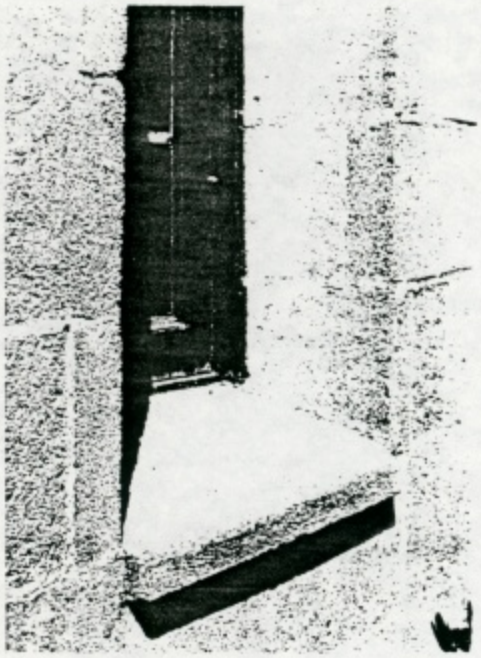
I felt the joy of creating something with life and I saw the possibility of developing a new method that would make the whole endeavor of creating a beautiful CMU structure much easier and more accessible.

From this experience, I assume that the average mason or construction worker would want to feel the same thing if given the choice. If allowed to choose between making a wall from the average dead materials and making the wall from materials that are alive, I believe that we all would chose the latter. I believe that everyone of us would choose something that feels real and alive over something that is merely cost-effective or efficient. Materials and buildings that fulfill only those basic requirements are not good enough. We all crave something more.

Crane Memorial Library

The Priority Existed

We didn't always have such a disabled notion of what made us feel good. The last sixty or seventy years have been progressively more and more empty of feeling. But it really hasn't been that long since our cultural priorities made it possible to produce buildings that made us feel real and alive. While I am certainly not proposing that we return to some ancient or nostalgic method of construction, I do think that we can look at how different the results are when a culture respects the need to have an environment which is based on a real human reaction and connection to things. There is no reason that we should ignore our needs simply because of the current state of economics. Again, I am not proposing that we take a step backwards. I am proposing a step forward that includes a



Second Church of Christ Scientist

perspective of the past and I am proposing something that works within the boundaries of the system which is already in place.

These brief examples show that at times in the past we have had the capacity to produce beautiful structures using masonry construction. We have done it before, we can do it again. The methods are different and that only means that things must take on a contemporary quality when we attempt to do this again. Once we see how good it feels, we will demand it.

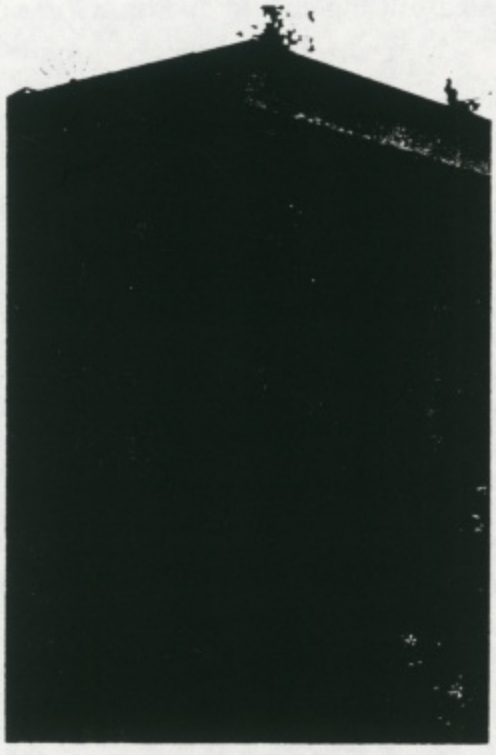
Plug Into Modernity To Make A Real Impact

How can we do this again? How does the making of beautiful and meaningful architecture fit into the big picture which is dominated by consumerism, mass-production, and industrialization? Is there room for a belief system that values aesthetic harmony, structural honesty, and human feeling in this current mind-set? I think the shift will happen gradually at first and as we begin to notice the subtle improvements, we will make it more of a priority. With this belief then, the best way to begin the shift is from inside the system. I want to plug into the system and make the changes in small and subtle ways.

My proposed hybrid block involves a simple method of adding life without requiring any special tools and without incurring a prohibitive increase in cost. I envision that these hybrid units will be available for purchase at the same places that we buy the typical CMUs. The hybrid blocks are not made through the same manufacturing process as a contemporary CMU. Instead,

individual metal forms are used indefinitely to produce each of the blocks. The forms are made up of components which can be switched to create different profiles and configurations. It does take longer to produce each unit but since they are used in relatively smaller amounts, they don't need to be manufactured in the same volume as the CMU. By being used with the mass-produced CMU and being products of a small-scale production, the hybrid blocks connect and feed off of the modern practices of mass-production and provide for possibilities which are not currently possible.

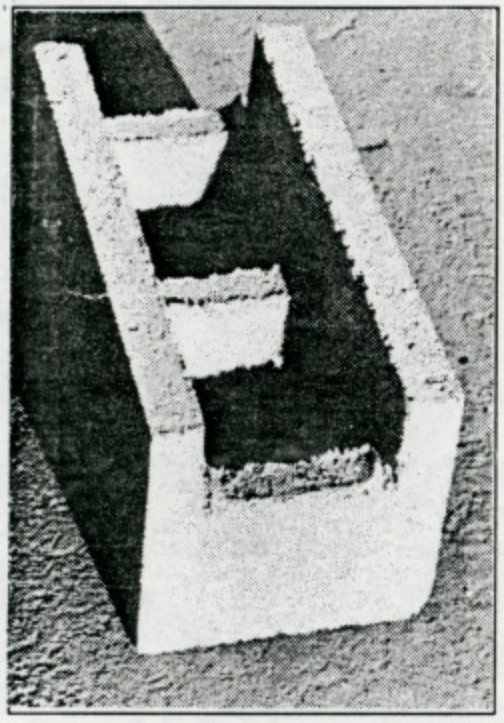
Chapel of the Chimes



Journalism Library, UC Berkeley

The Concrete Masonry Unit Is The Vehicle

I see the concrete masonry unit as a vehicle to inject this soul into the built environment. The CMU is ripe for this type of investigation because of its relationship to other types of masonry construction which historically have been capable of creating beautiful structures. Additionally, the



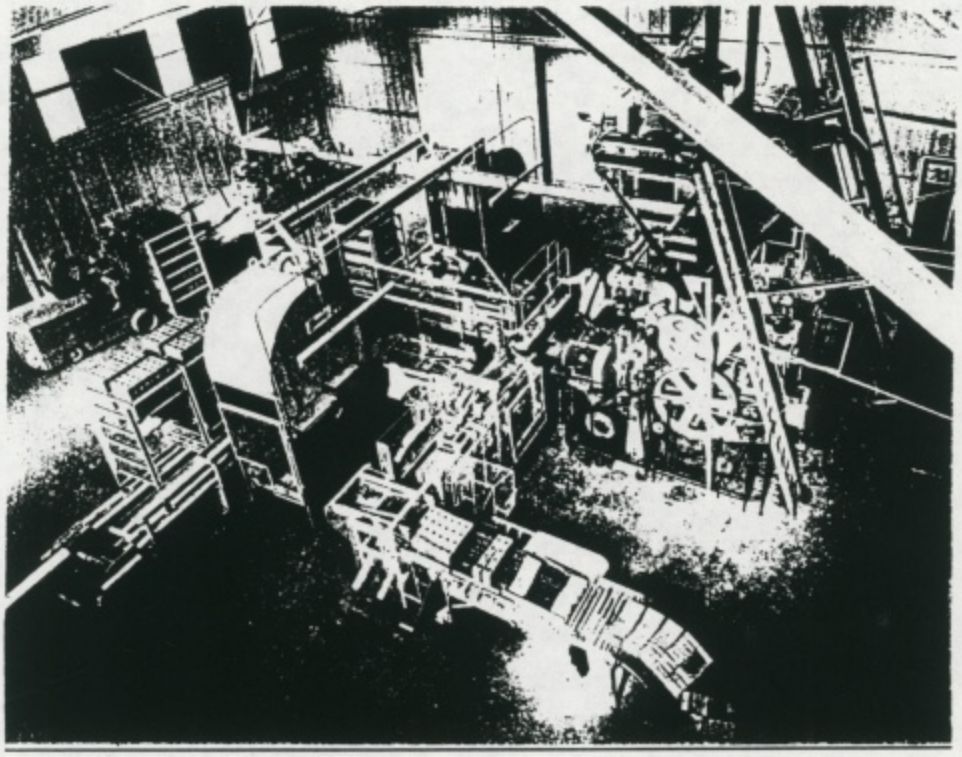
Typical Concrete Masonry Unit

CMU is inexpensive, widely available, and can be reinforced with steel to provide structural performance that other masonry systems cannot.

My own personal interest in finding a way to combine my interest and experience in sculpture with what I have been learning in architecture school led to the proposal I make in this article. I have always wondered how I could bring sculpture into architecture and in two past studio projects I chose to use concrete block with a vague plan for incorporating some sort of pre-cast concrete elements with the blocks. I never had the time in the context of these studios to really pursue this possibility in detail so I was very excited to get some positive support when I proposed this as my project for the Atelier.

Finally, the concrete masonry unit seemed a good choice because I could imagine finding a way to mesh the making of wholeness with the current method of mass production of building materials. (Which is, in my opinion, the key to integrating wholeness with our contemporary building culture.) The hybrid unit is an attempt to fuse a quality of spirit which is currently missing in contemporary architecture, through specifically designed geometrical configurations, with the dull blocks that dominate the architectural landscape and through an explicit and intentional cooperation with our modern methods of production and construction. Because of this cooperation, the hybrid will have the most effective and immediate influence on the physical environment.

Our Current Process Of



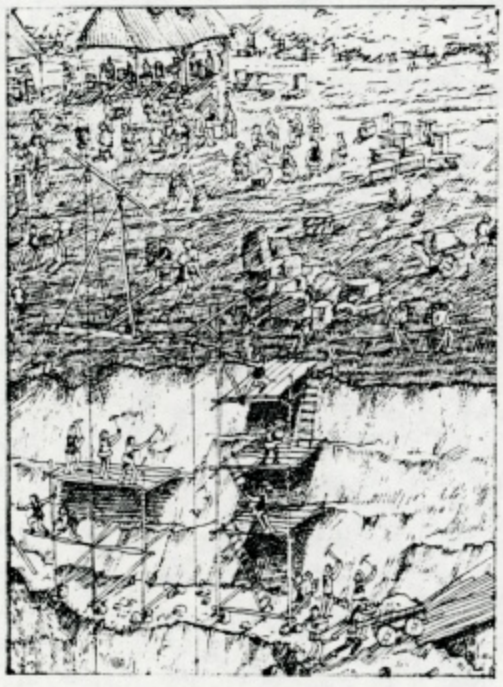
Modern manufacturing process of CMU

Production Fails Us

The way that building materials are produced has a direct influence on the way that buildings themselves are made, specifically the concrete masonry unit, whose manufacturing process controls the way that the block itself looks. The individual blocks are not necessarily beautiful things alone and so it is not surprising when the buildings made of this material are typically less than beautiful. Should we accept this as the only way to make buildings simply because a machine dictates what we have to chose from? Should we accept this when these walls and buildings that have no character actually decrease our quality of life? I think this system should be challenged. Economics and efficiency should not be the only generative forces at work in our environment.

Maintaining the large-scale process of manufacture but allowing for additional types or scales of production will help in creating a variety of available

building materials which will then help to make buildings with more life. This is similar to a Gothic cathedral construction system which, because of its large scale, required the mass quarrying of stones of a regular size and shape in addition to the production of special-case stones for specific uses. This type of production system was capable of producing the variety of building units needed to create a thing with real beauty and life while still meeting the needs of a large project that required many repetitively shaped and sized pieces. So maintaining the current manufacturing process and adding an additional, smaller production process will allow for the specificity that helps to create richness in our architecture.



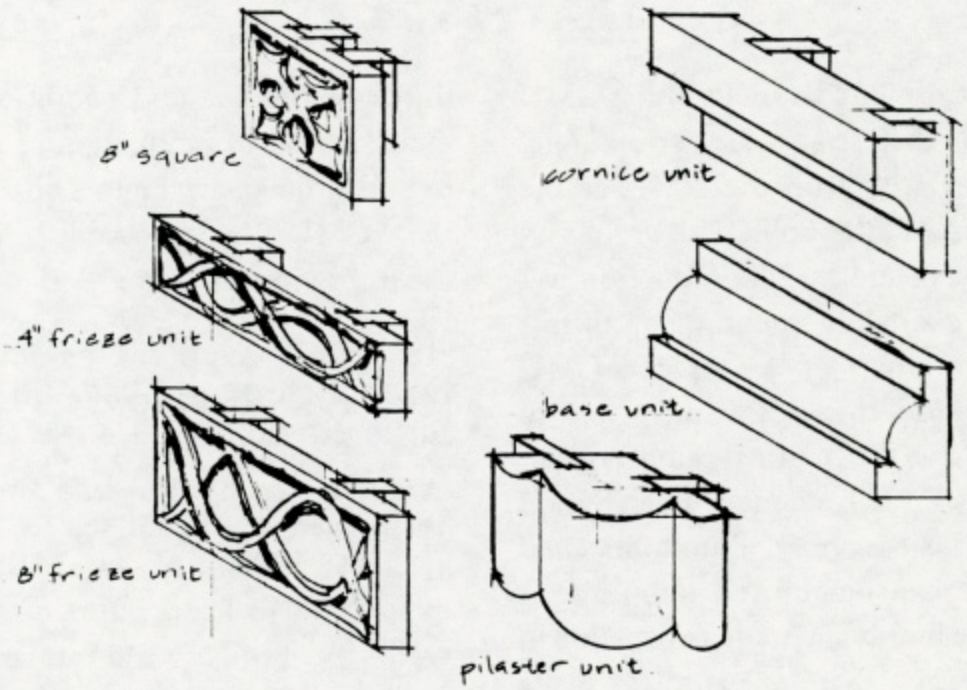
Gothic example

The Proposal: A Hybrid Concrete Block

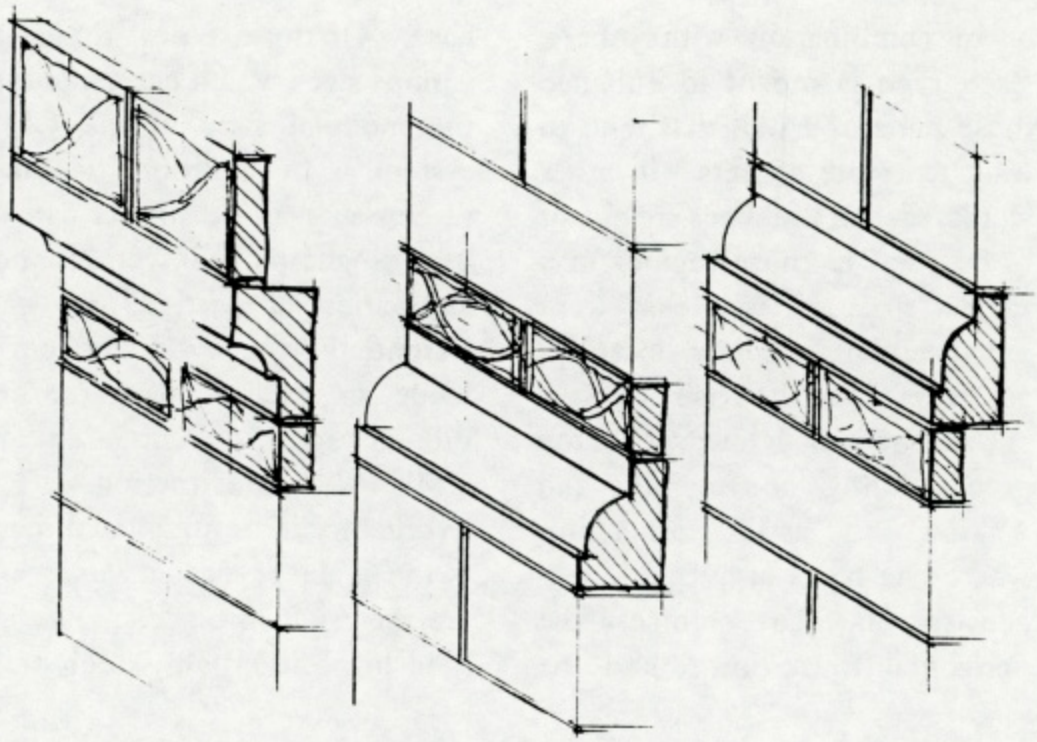
By making a few small contributions to the CMU system that would enable the creation of a beautiful masonry building with slight increases in the cost of materials and labor, I am proposing to take advantage of the good characteristics of CMU construction and combine it with something that allows for more variations and specificity. What I am proposing specifically is a type of concrete unit that fits directly within the modular of the concrete masonry unit. These hybrid blocks are made to be placed into the wall and grouted in place while the wall is being constructed in the same conventional method that is currently used to build with CMU. The units are easy to install and they do not require any special tools or techniques to use.

There are at the moment specific types of these hybrid units. Each can be used singularly

or in combination with others. Each type is meant to enhance those parts of a wall that tend to want to create centers. In other words, each of the types are meant to be used in those regions of a typical masonry wall that want enhancement. These locations are generally at the base of a wall, at a change in floor level, at the top of a building, above doors and windows, and at the corner of a wall. The types of hybrid blocks consist of: the cornice, the horizontal frieze units, and the base. Of these types, there are various sizes which correspond to the modular sizes of the CMU system. In addition to these placements, these blocks can be used singularly or in combination at a variety of locations in a wall. Essentially, the hybrid system is made to accommodate for and provide specific centers in any CMU wall construction. The hybrid blocks are attached directly to the concrete masonry units and are mortared in place. They are held in position with steel straps



The Basic Types Of Hybrid



Variation of Hybrid Units

that slip into the cells of the CMU and the straps are structurally integrated with the CMU as the cells are filed solid with grout.

The method of production, as I have already mentioned, differs from that of a typical CMU because this is the only way to achieve the physical geometry that is essentially needed. Each hybrid unit is cast in an aluminum mold that can be re-used indefinitely. The molds are made to function in a way that is similar to a typesetting machine. Individual components can be used to create different profiles and conditions. The method of production of the hybrid units compliments that of the CMU by providing the capability for variation.

Control Through Cost And Structure

- **What Determines The Use And Placement Of Each Block?**

Because these blocks are used by individuals in specific projects I will have little or no control over their ultimate usage. But there are certain factors that must be

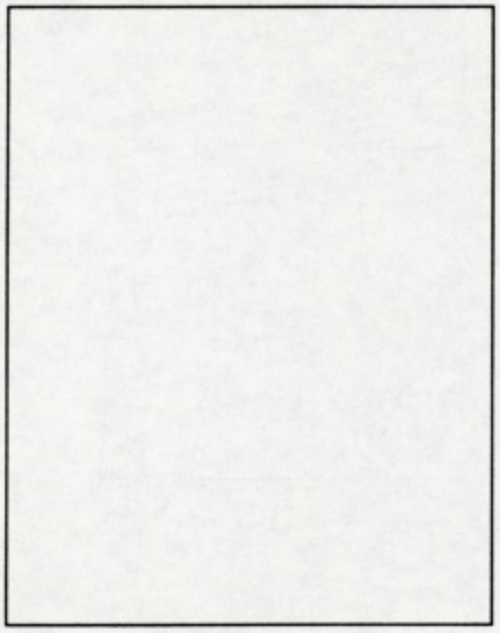
considered when these pieces are used and it is these factors that become the determining or controlling forces. So, while I will ultimately have only a small amount of control over their use and don't even desire it necessarily, there are inherent properties that will influence the ways which they can be configured and used.

▪ Structural Behavior

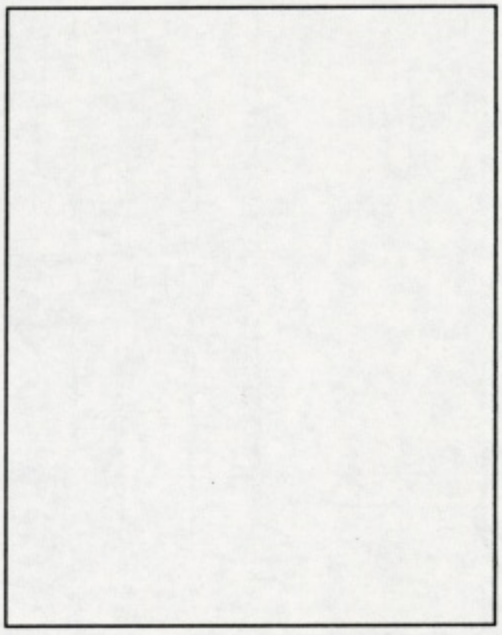
Because of structural and code requirements I will eventually develop a set of guidelines that help define the limits of the use of these units. For the most part the blocks can be used in a number of combinations or locations. Yet, because the units reduce the cell area of the CMUs, they can safely be used only within specific regions of the wall if the CMU is performing structurally. These regions occur at the base of a wall, at the floor connection, and at the roof line. These regions correspond to areas that most naturally want a center to occur.

▪ Cost

The other factor which will determine the usage is the cost-per-block. Each hybrid unit costs roughly two to three times



Structural Use



Cost Use

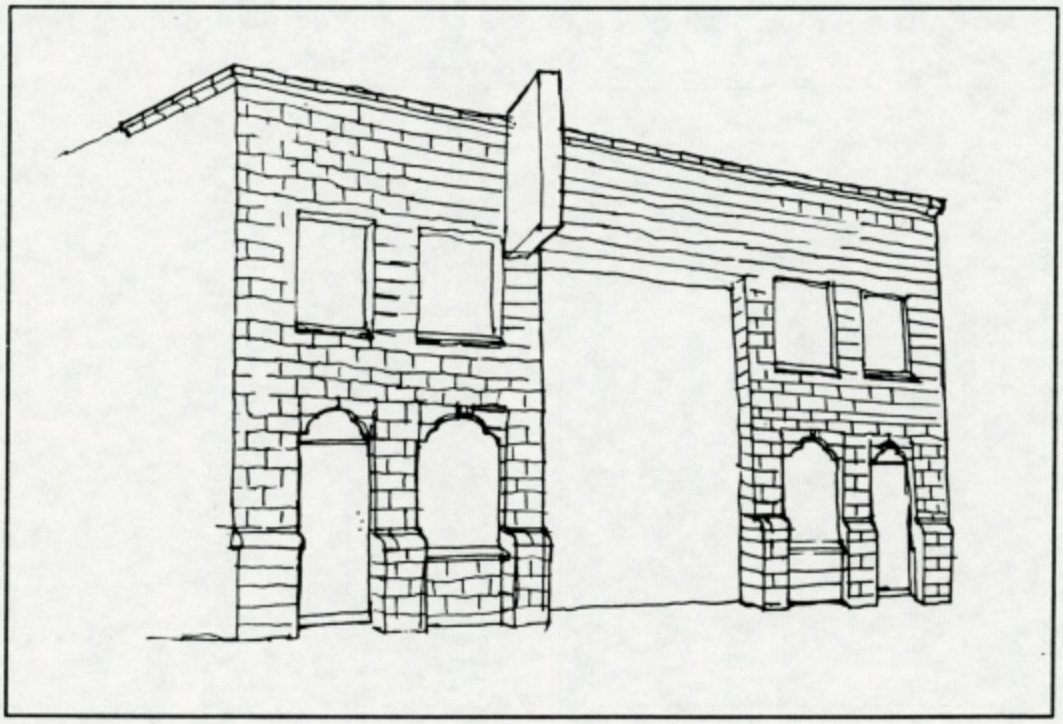
the cost of a block of a corresponding length and height. This means that they will most likely be used in a percentage proportional to this cost difference. In a wall, then, the usage of hybrid units will occur at a percentage of about ten or twenty per hundred. (10% to 20%)

Essentially the structural impact and the cost-per-block will help to direct the way that the blocks are used. The inherent nature of the hybrid units will give shape to the way that the wall will evolve. This will reduce the possibility that they will be used randomly or without any consideration for the larger structure of the wall or building the are making.

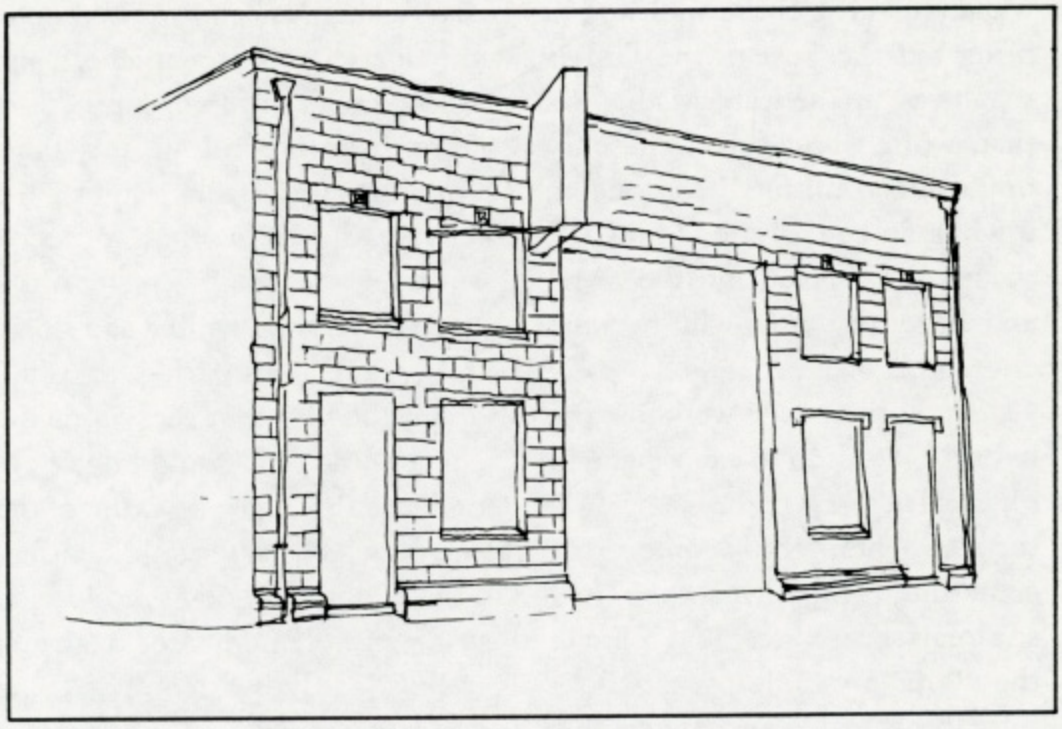
The Process Of Creating The Hybrid Block System

▪ It's More Than Just One Little Block

Most contemporary buildings are disturbing because of their homogeneous and sterile character. This monotonous quality does nothing to help create



Axonometric section of wall with Hybrid Units



Axonometric section of wall with Hybrid Units

a wall or building that resonates with me as a human. I want to have a relationship with these things and I want to create the opportunity for this harmony to occur. If the blocks do this singularly, the chances are greater that the larger wall or building will also resonate with me. If a wall can be made with CMU and hybrid blocks, the chances of something beautiful evolving are improved because each hybrid unit has been developed and thought out with the specific goal of producing life at each level. In order for this type of resonance to occur, it is essential that each block contains elements of smaller harmonies. Each level must perform in a way that supports and enhances every other level. In essence, I believe that the blocks have to be beautiful enough on their own to the extent that a person will want to take one home and live with it. If the blocks don't do this, I doubt if they will be successful at creating life when they are used in a larger context.

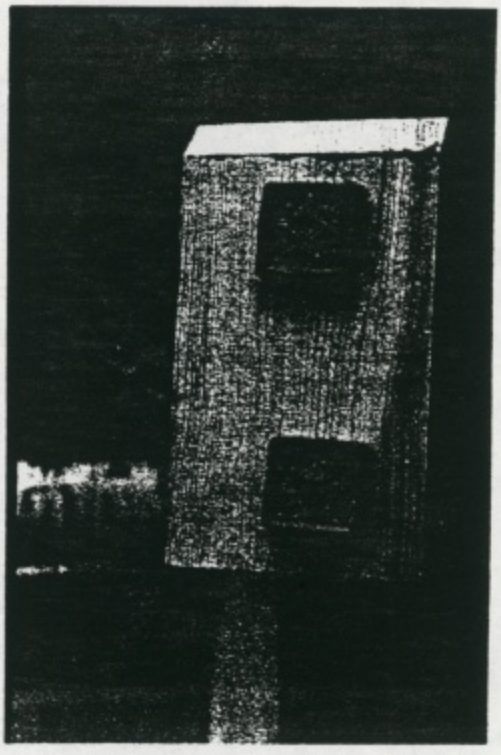
For each hybrid unit to come alive, it must be made up of components that enhance it. Each hybrid is intended to act in a small

way to help the entire wall. and to bring out the best of the CMUs that make up the wall. My hope is that, while the concrete masonry unit itself is dull and lifeless alone, it will grab hold of the hybrid and the hybrid will grab onto the CMU and together they will become alive.

In addition to the work that the hybrid blocks do to help create a physical richness in the CMU wall, they also help the people that come into contact with them in a spiritual way. When there is life in the wall or building, it does something real to us. When this happens, there is a resonation between us and the thing itself and we feel connected to it. In this way, the blocks have a big effect on the intangible or feeling qualities as well as the physical or geometrical qualities. Hopefully the structures built using the hybrid units will create life in both a physical and a spiritual way.

The Process: Giving Life To Each Block

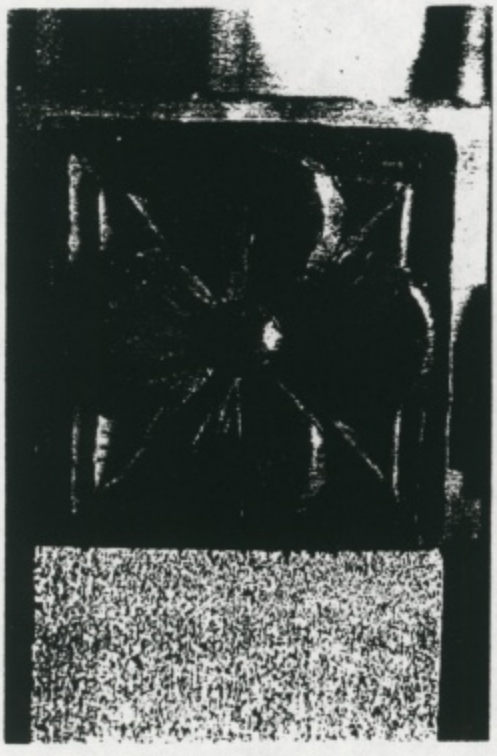
While making each block, I tried to work with a life-creating goal in mind. In the example of the 8" square block, I began with clay "sketches" and worked up to the final cast concrete piece. I also worked with different methods of form-making. All of the time, working with the larger and smaller aspects in mind. I tried to consider the small square block itself and how it worked as a single entity yet I also tried to think about the way that these singular square blocks would need to enhance the larger structure of the wall in which they would be used. Finally, the method of production was an element to consider because different manufacturing



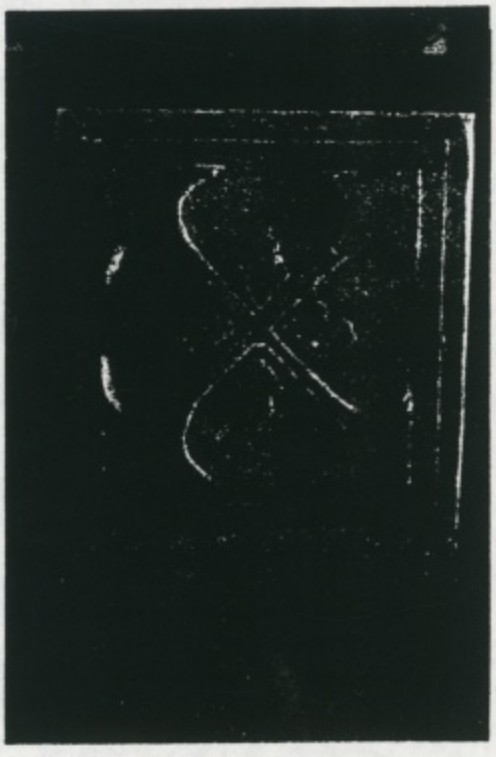
Clay Sketches

Carved Clay Form

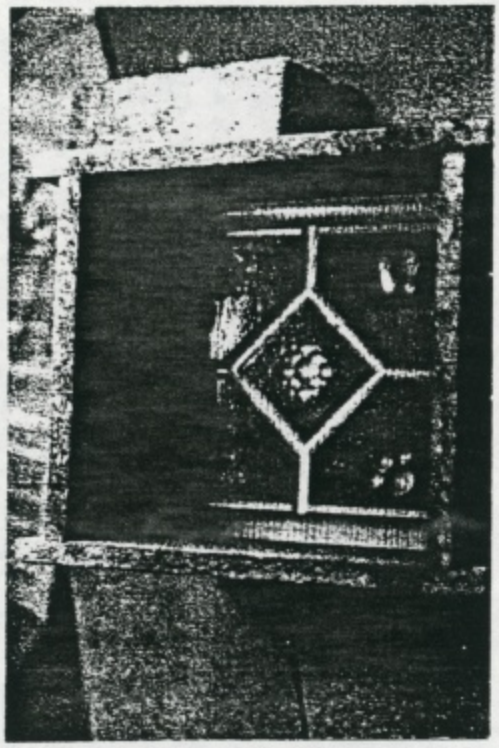
Plate Form



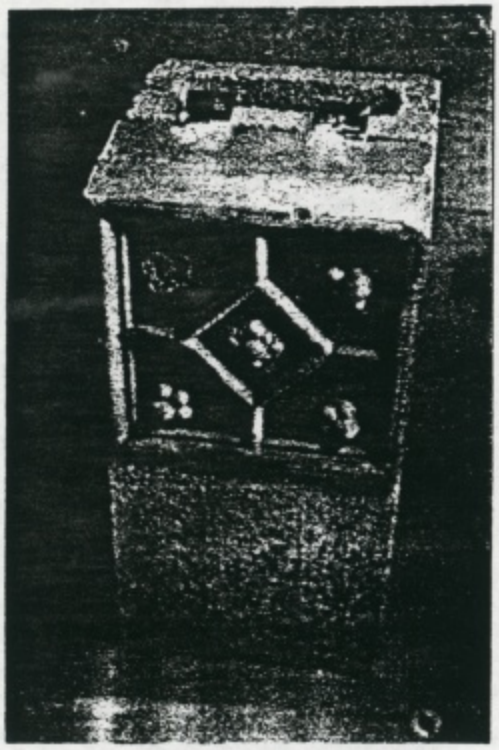
Casting from Carved Form



Casting from Plate Form



Milled Form



Casting from Milled Form

processes would create distinctly different final products.

This same process of local and global consideration applies to the way that the different types of hybrid blocks can be arranged and positioned within a masonry wall. Their possible configurations and the various ways in which they can be combined must include this same process of checking to make sure that all of the parts support and enhance each other. In fact the process of defining the types of hybrid blocks specifically used this process to determine which areas of a typical wall needed to be articulated.

The hybrid block itself is small but its effects are not. It makes a connection between the modern world of production and the realm of wholeness. Each hybrid block is made up of parts that contribute to it and each hybrid block enhances the regular masonry units. They both contribute to the larger wall and the wall helps the building. The building helps everything around it, including the spirit of the people that come into contact with it. The potential for a real connection is there with each block... the way it is made, used, seen, felt, etc. With each

component, there is a distinct potential to enhance everything around it.

Evaluation: Do These Hybrid Blocks Actually Perform As I Had Hoped?

Throughout the semester, I have maintained an inner belief in the importance of this project but I have had to fight with my own fears that it might not be embraced by a larger audience. I was worried that my peers wouldn't think this to be an important contribution or that they wouldn't even choose to use the product. While I have received positive support and encouragement for the prototypical hybrid, I have yet to discover if this product will make even a small dent in the big sterile world of architecture.

I still have many questions that remain unanswered. Were these hybrid blocks successful in adding life to concrete masonry construction? Did they really hook into the system of modern mass-production in a way that made them a viable building material? Did people really feel

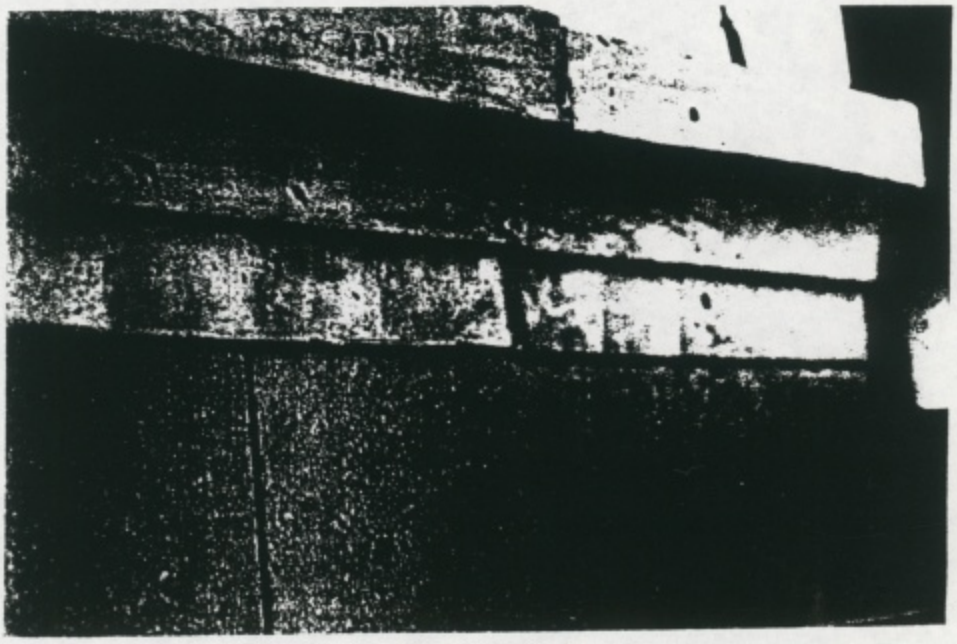
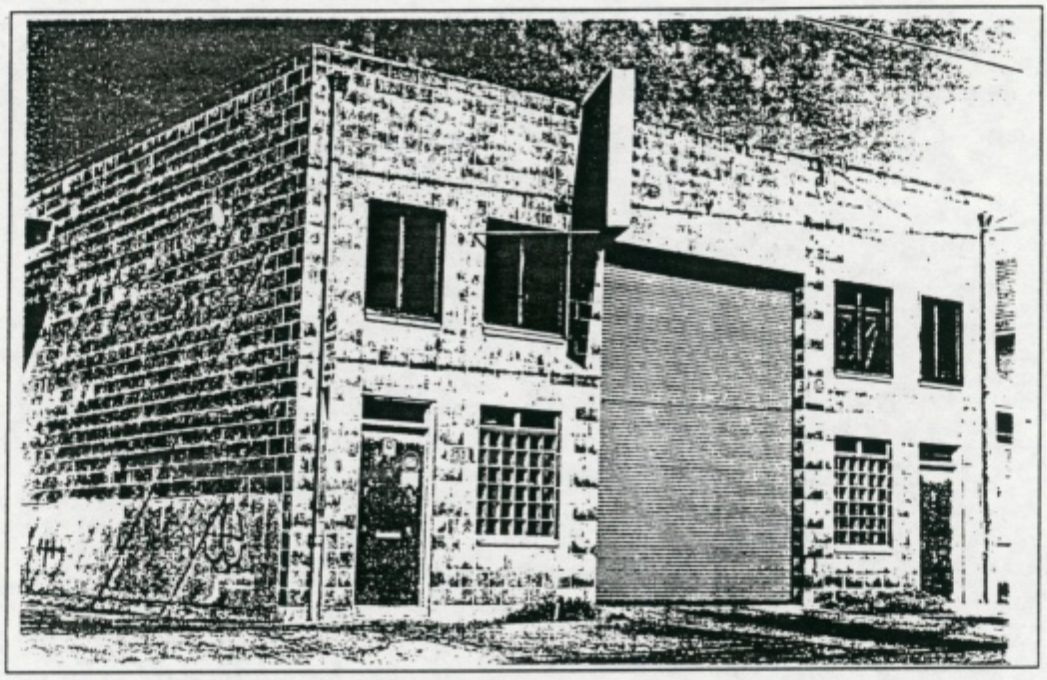
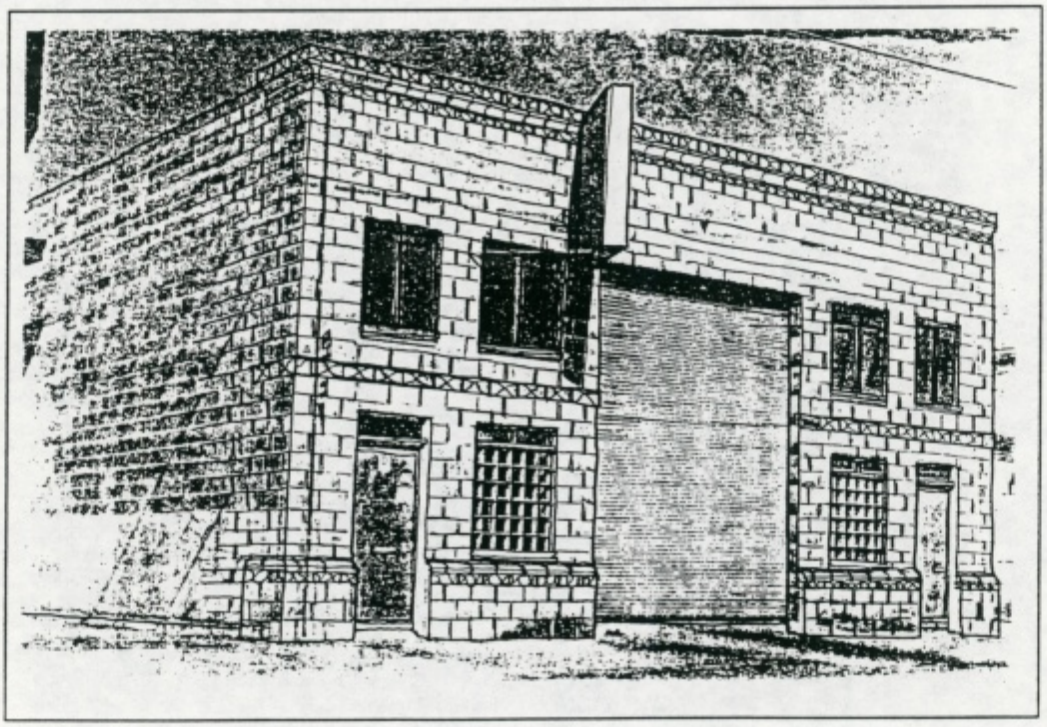


Photo of Blocks



Typical CMU building before



Typical CMU building after

the things I had hoped for? Are these blocks making an impact on the lives of people that encounter them? At a smaller level, I do feel that they have enhanced the context of a single block structure. When I see the difference in a simple mock-up, I have a strong feeling that these hybrid blocks will have a larger impact. But I have yet to find out if the hybrid units will actually have the type of impact I foresee in my vision. It is essential that I test them in the real world before this evaluation can be made.

How I Will Continue: The Next Steps

This is an incomplete project because I have yet to actually implement or use these hybrid units in a real project. In addition to this, I need to do further research on the cost and structural performance of the hybrid units. I will be continuing my work in these areas in the coming semester as part of my thesis work. Ultimately I want to actually begin production of the hybrid units I have described in this article and use them in some actual projects. This is essential to gauge the degree to which these simple things have impacted the world. My dream is to produce and market the hybrid units and to see my vision of the future of the built environment unfold.

Conclusion

The vision I have is not so far away or so unrealistic. It could happen today. If you could walk into your building supply store and buy these hybrid units for your wall, the momentum I have been discussing would be kicked into motion. By making little steps, by influencing in subtle manners, the hybrid block can touch the physical environment in a profound way. It can remind people of the stuff that they have been denied for the last several decades here in the United States. This reminder can set off a chain reaction. Other parts of the environment can take notice. Builders can remember the joy that was once present in materials. And ultimately, there can be a growing sense of the innate need for life in our buildings.

All that we need is to realize that there are other options. We

can choose to make something beautiful and touching. This is made easier when we have the option readily available. Our society is built around consumerism and productivity. If we work from within that system, I believe that slowly a change will take place. My contribution to this change is in making a small thing available to be used with the materials that are already out there. I believe that when the choice is there, it will become evident that we don't have to accept the lifeless type of buildings that are being made. We will see it, we will feel it, we will remember it, and we will then demand it.