A Pattern Language
Exploration
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Architectural Thesis
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A Pattern Language Exploration represents not a product, a finished design, but rather an experience. It involves a product, a suburban housing project in Evansville, Indiana, but primarily as a media for education. The drawings in the front of this document present, in an abstract way, the beginning of a healthy neighborhood: a square, a community center, a construction workshop with support facilities, an architect's office, and several dwellings. The log which follows presents a trial and error search for an understanding of an alternative design and construction process which is capable of bringing them to life.
acknowledgments

C. Daniel Woodfin: for his great professional dedication, personal sacrifice, and just being a friend.

Christopher Alexander: for seeking a better way, a quality without a name.

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The numerous un-named friends and relatives: for their years of moral support.

Love and thanks to all.
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summary of contents
**PHASE I:** The initial studio development, as illustrated, confusingly represents both the beginning and end of an evolution of thought. Here is a thorough contextual, site, and programmatic analysis of the project by means of a step-by-step application of the first 66 patterns in *A Pattern Language* by Christopher Alexander. The confusing aspect is that it was rewritten after I had freed my mind somewhat from the confines of modernism and was only then capable of accepting Alexander's concept of piecemeal growth.

The initial draft, as evident in the first design proposal, was written from the viewpoint of currently accepted nodes of design, development, and construction. It was meant to serve only as a tool for the paper design of a complete neighborhood. As explained in this section, I no longer believe that is possible if a "real" neighborhood, dynamic and healthy in all its complex functions, is to be the result.

Thus, the printed draft is meant to provide only a framework for piecemeal growth under the guidance of a new design and construction profession. This is the only real and feasible way to bring these patterns to life.

1st DESIGN PROPOSAL: The culmination of three months of frustration at reading Alexander's theories and trying to apply them in a studio environment. At this point, I had realized the futility of trying to design and build an entire neighborhood at once and still deal with the specific issues of detail and context which create a healthy environment. I had drawn a conceptual design based upon my first draft program and could already see that this process wasn't capable of producing the quality to which I aspired. Thus, I decided that to gain a true understanding of Pattern Language, I had to try it the way it was meant to be: dealing with specific design issues, one at a time, in order of priority, and on the site itself.

**PHASE II:** A log of on-site experiences and sequential design decisions while laying the groundwork for initial neighborhood development. A week was spent, on site, simultaneously designing and staking out the site plan and preliminary massing for the building complex illustrated on the next few pages. This was a very real and exciting experience! For the first time, patterns were no longer abstract concepts drawn on paper, but real images inspired by and responding to a specific context. Design decisions that are usually preconceived notions or a matter of opinion in the studio found a basis of testable truth when made within context, at full scale.

2nd DESIGN PROPOSAL: An inspiration from both the results of the first on-site experience and further research into Alexander's housing experiments. At the time, I simultaneously faced a dilemma and further enlightenment. As defined by Alexander, a house cluster is both a physical and social product. It is made up not only of homes, but of bonds between
people, their neighbors, and their homes. This is only possible by a sharing of the design process; if not totally, at least in a small way. On this basis, the architect would have to relinquish some design control and serve more as a counselor, helping the future occupants to design the cluster themselves. In theory, the reality of full-scale design and the ordering effect of a shared pattern language makes this team effort possible. Thus, with the aid of a prepared program and several volunteers, I decided to try it.

PHASE III: A log of on-site experiences and sequential design decisions while simulating an occupant-designed housing cluster. During this trial run, a group of five persons spent two days on site, designing and staking out their house cluster. Working as a team, with myself and the shared pattern language being mediators, approximately 1/2 days were spent designing the cluster as a whole. Proceeding from the large scale decisions to the small, the final hours were spent by individuals roughing out their own homes. While we identified several flaws in our preparation and were extremely short on time, it was a rewarding experience for all with some excellent results.

As two members of the team had no design background, it was extremely exciting to observe their participation in decision making and likewise their pro-

found acceptance of an uncustomary housing concept. Additionally, the value of on-site design was again borne out.

PHASE IV: A sequential log of "final" design decisions made in the studio. Due to weather and time constraints as well as the need to have a "finished" thesis project, the initial neighborhood development, (public square, community center, workshop, office, residence, apartments), was completed with the aid of models and drawings. This was accomplished, still with the use of pattern language, by determining further priorities, dealing with one group of issues at a time, documenting those decisions, and proceeding again.

The result of this effort, being the "final" drawings, produced both an exciting and comfortable environment. Yet, I believe this was only possible because of the insight and understanding I gained through the on-site experiences. Likewise, I firmly believe that, even though the product is fairly rich, the complexity and quality would be intensely multiplied by carrying the process, through construction, to the extreme.

MATERIALS, METHODS & COSTS: A brief description of potential materials and techniques compatible with the proposed design process. These are important factors, considering the process would be rendered nonfeasible by current construction practices.
conceptual & programatic design
PREFACE: The following program is a guideline for the neighborhood development of Sun Meadow according to my interpretation of the process described in The Timeless Way by Christopher Alexander. It is meant to be the basis for an entirely different form of housing development; not the usual molded production of 150 units, meeting minimum standards, and stamped out in two years. Through this process, the neighborhood will grow naturally, piecemeal, capable of adapting to an ever-changing context and altering needs. Homes will be created under circumstances which allow people to develop bonds ... to the house itself, to their neighbors, their neighborhood, and society as well. These homes will each be unique and expressive of the individuality of the owner and they will be built at a cost lower than the current speculative price!
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BACKGROUND: Sun Meadow, located in Evansville, Indiana, was previously chosen as the site for a speculative multi-family housing venture. The site, composed of approximately thirty acres, one-third of which is Pigeon Creek flood-plain, is on the N.E. side of town. The location is a rapidly growing suburban area composed of tract homes in the $60,000 to $130,000 range. It is closely linked to major transportation arteries, served by both public and private schools, and within a five minute drive of major shopping facilities.

Accepting this site as a given, the purpose of this program is to reconsider it in terms of a more acceptable, lower cost housing alternative to our current modes of design and production. This is accomplished through the analysis and application of the design/construction language and process proposed by Christopher Alexander. Though modified occasionally by this author, his writings, A Pattern Language, The Timeless Way of Buildings, and The Production of Houses, are used as guide and model.
PROCESS: This process embodies several principles which are inherent to the use of the program.

1. It is radically decentralized. There are no housing "estates" of 500 units financed and built by a single entity.

2. New construction is considered a process of repair. Every act of building has the responsibility to itself and society of repairing as many "problems" as possible within its context.

3. The basic unit of production is the builder's yard. It serves as a base for construction, a center for the community it serves, and a home base for the "local" architects and builders. It itself embodies the construction principles and processes; a physical and human organization capable of overseeing the production of 20 - 40 homes per year.

4. At a lower level, the basic unit of production is the house cluster, designed by the occupants themselves. It is a group of 5 - 8 homes, built simultaneously, with their own common land. The human associations formed between the families during the cluster layout provides the social basis of the production process.
5. At a still lower level, the houses are programmed and designed by the individual families who will live in them.

6. The process of construction itself relies mainly on processes, not prefabricated components. Thus, the building materials and details will be more reminiscent of traditional buildings, than highly industrial ones. Yet, the procedures themselves are finely tuned and developed to adapt to local conditions.

7. The process is run by an entirely new kind of professional, the architect/builder, who combines the functions of architect, builder, and developer in a way similar to that of the medieval master builder. Briefly, his responsibilities entail:

1. Organizing the financing and support of local officials which will permit the development to be built.

2. Identifying the construction site and establishing the builders yard.

3. Identifying problems and solutions too complex for the lay person to fully comprehend.

4. Seeking and organizing families who will form clusters.

5. Helping the families to layout and design the cluster and the individual homes for themselves.

6. Developing and testing the application of new construction materials and techniques suitable for the site.

These seven principles are given life, organized, and made manageable by pattern language. The language described by Alexander in *A Pattern Language*, provides a backbone which can be gradually expanded and shaped to meet local conditions, tradition, and culture.

The language analyzes problems and their "ideal" solutions as they have been identified in the built environment. It also constructs the relationship between problems or patterns and orders them sequentially in terms of priority. Thus, each pattern, beginning with those describing towns and ending with those dealing with actual construction, analyzes the context, defines the problem, and defines the framework for the solution. When implemented sequentially, each pattern can be fully resolved, designed and built within a given context. Likewise, the next issue or pattern can be resolved within the context provided by the previous. It can even be used to "repair" or correct apparent deficiencies in earlier decisions. It is within this framework that the following program is organized.
INTRODUCTION: "We begin with that part of the language which defines a town or a community. These patterns can never be designed or built in one fell swoop — but patient piecemeal growth, designed in such a way that every individual act is always helping to create or generate these larger global patterns, will, slowly and surely, over the years, make a community that has these global patterns."

The first 66 patterns paint a scenario of a complete neighborhood and its relationship to context. They create a "language" for neighborhood development which is meant to serve as a guideline for piecemeal growth. Each pattern has been chosen and developed according to the needs and context of the Sun Meadow site. Those responding to immediate demands and design issues are identified and will be dealt with early in the construction process. Yet, all patterns are quantified to the extent possible given the existing and projected context. This is meant only to illustrate or conceptualize how the pattern may eventually develop in the neighborhood.

As the neighborhood grows, piecemeal, the direct application of many patterns will change. Likewise, the language will grow also; new patterns will appear and old ones will develop new meaning."
FORMAT: 1. A quote describing the emphasis of each group of patterns.
2. A quote describing the particular problem addressed by individual patterns.
3. The application of each pattern to the project.
CITY POLICIES: "Through city policies, encourage the piecemeal formation of those major structures which define the city."
Fatts. 8-11.

8. Mosaic of Subcultures: "The homogeneous and undifferentiated character of modern cities kills all variety of life styles and arrests the growth of individual character."

9. Scattered Work: "The artificial separation of houses and work creates intolerable rifts in people's inner lives."

The site is engulfed by a heterogeneous suburbia with strict lines drawn between commercial and residential zoning. Furthermore, the work facilities within close proximity don't relate to local residents.

As a result, the current residential zoning should be immediately petitioned to allow the emergence of light commercial and business activities on the site, even within homes. This step will not only help to distribute work, but will allow a further expression of life-style, a key to the emergence of sub-cultures.
11. Local Transport Areas: "Cars give people wonderful freedom and increase their opportunities. But they also destroy the environment, to an extent so drastic that they kill all social life."

Oak Hill road currently serves the area as a major artery with Burgdolt Road functioning as a feeder. There is a proposed extension of Lynch Road which will also serve as a major road.

To reinforce a hierarchy of movement and thus limit neighborhood traffic, vehicular site access should be limited to Burgdolt Road. Also, a buffer to the south of the site should be maintained as protection against the proposed Lynch Road extension. These steps, if supplemented by pedestrian and bicycle paths connecting the site and adjoining neighborhood, will eliminate through neighborhood "shortcuts" and encourage the use of minor modes!"
SEFGOVERNING COMMUNITIES:
"Build up these larger city patterns from the grass roots, through action essentially controlled by two levels of self-governing communities, which exist as physically identifiable places" Patto, 12-15.

14. Identifiable Neighborhood: "People need an identifiable spatial unit to belong to."
15. Neighborhood Boundary: "The strength of the boundary is essential to a neighborhood. If the boundary is too weak, the neighborhood will not be able to maintain its own identifiable character."

The adjoining residential area already functions, somewhat as an identifiable neighborhood of 280 residents. The site development should reinforce its autonomy and identity. This can be accomplished by: A) Physical Definition and B) Land Control.

A) Physical Definition

Boundaries: The site already has substantial physical boundaries on three sides: An on-site flood plain to the south, a horse pasture and flood plain to the east, and an electric power right-of-way and road to the north. An additional boundary must be created between the site and the adjoining neighborhood to the west.

The southern boundary, being in the flood plain, should be limited to minor recreational development and reforestation.

This area will serve as the required buffer between site and the proposed Lynch Road extension.

The northern boundary, being under high power lines, has severe physical and psychological limitations. It could be developed for surface recreation, but is probably best left undeveloped or used for overflow parking. In addition, a visual buffer is required here to eliminate offensive views of the trailer park.

The western boundary, functionally north-western from a vehicular viewpoint, is necessary to simultaneously give the neighborhoods identity and unite them. As several later patterns identify, there are many needed shops, services, and activities which require the population of all adjoining neighborhoods to support. These shared functions should be located in this common zone and thus used to help form the boundary.

Access: Vehicular access is already limited to the boulevard feeding Byrd Road due to the hierarchy established in Local Transport Areas. Since this road is required to service two neighborhoods as well as the shared boundary zone, all three should be individually reinforced with gateways. These are necessary to distinctly mark passage into each of the three realms.

In addition, pedestrian/bicycle paths linking the adjoining neighborhoods should be limited and reinforced with gateways. Perhaps only two paths are necessary, located at the termination of the east-west streets of the adjoining neighborhood.
b) Land Control

Shared Facilities: An inter-neighbourhood organization, either entirely political or in the form of a social/recreational club should be organized to control the development and upkeep of the shared boundary zone. In the absence of a city program or a means of taxing community residents, the latter membership organization seems most appropriate.

Under this format, all on-site residents would gain membership with ownership. The adjoining neighborhoods would have to be canvassed for members, but the facilities and services to be offered should entice them to join.

The organization, once financially solvent, would acquire shared ownership and control of all boundary property. Income will derive from commercial and residential leases of facilities in the area, the sale of memberships, and club dues.* A director will be hired to handle management and daily decisions, but control should remain in the hands of a representative electorate. This shall consist of one resident from every 6 - 10 membership homes. Provision should be made for membership votes on controversial issues.

*The potential of municipal subsidies for recreational lands should be explored.

When necessary, the neighborhood organization shall hire a private contractor for the maintenance of its lands. While facilities for such an operation will be provided within the shared boundary, they should be leased on a yearly basis.

Joint and private owners both may contract with the on-site operator, but will not be compelled to.

Neighborhood Facilities: The organization of the neighborhood itself resembles a co-operative, but is slightly more complex. The first level of ownership applies to all neighborhood land not within a housing cluster or the shared boundary zone... bike paths, neighborhood greens, flood plain, recreational land, etc. This will be owned by a neighborhood association consisting of all property owners. Yearly fees for its upkeep will be imposed by the neighborhood council consisting of delegates from each cluster.
Connect communities to one another by encouraging the growth of the following networks. Patts. 16-20.

19. Web of Shopping: "Shops rarely place themselves in those positions which best serve the people's needs, and also guarantee their own stability."

The site area is currently void of any local shops and services, yet there seems to be a demand. Calculations and graphic surveys show that at the local density of 7,296 persons/square mile, the site and immediate area can support several shopping patterns. The conclusions were also checked with an analysis of the services offered in a small community of 900 persons.

While the site, when fully developed, will complete an immediate catch basin, (500 yard radius), of at least 1200 people, the population of the existing basin is only 800. Accordingly, the facilities should be developed piecemeal based on need.

Immediate Needs

Design and Construction Facilities:

Patt. 87.1 Builders Yard

Interneighborhood Social/Recreation Club:

Patt. 44 Local Town Hall
Patt. 72 Local Sports
Patt. 88 Street Cafe

The local town hall is combined with club facilities for the sake of economics. These are designated as immediate needs for three reasons:

1. The inter-neighborhood organization developed in patterns 14 and 15 needs immediate implementation to control the future development of the boundary; perhaps it can entice the future development of commercial facilities by offering low cost leases!

2. The builders yard and related facilities will be primarily servicing the site during their initial implementation. As a result, a strong inter-neighborhood facility is necessary to instill community belonging from the beginning.

3. These are cooperative facilities. With the aid of pre-construction memberships, guaranteed commitments, and phased expansion, the initial financial risk is not nearly as great as that of a private facility.

Long Range Needs

Expansion of Social/Recreational Club:

Patt. 72 Local Sports

Commercial Facilities:

Patt. 87.2 Neigh. Pharmacy
Patt. 87.3 Barber/Beauty Shops
Patt. 87.4 Local Dry Cleaners
Patt. 87.5 Neigh. Hardware
Patt. 87.6 Neigh. Gardener
Patt. 89 Corner Grocery

All of the above facilities, immediate and long range, provide inter-neighborhood services; they need the entire catch basin for survival. As a result, they should all be located in the shared boundary zone.
NEIGHBORHOOD POLICY: "Establish community and neighborhood policy to control the character of the local environment according to the following fundamental principles." Patt. 21-27.

24. Sacred Sites: "People cannot maintain their spiritual roots and their connections to the past if the physical world they live in does not also sustain those roots."

The wooded flood plain of Pigeon Creek has long served as a sacred site to area residents; a place to hunt, fish, and play. This land or at least a portion of it should be preserved. Since it is deep in an active flood plain, this might seem automatic but conversely, the proposed road will destroy it. Opposition to this insane destruction should be a major cause of the inter-neighborhood council, once formed.

In the meantime, the immediate reforestation of the southern portion of the site would at least preserve some of the character. Pathways through this zone should be developed with a variety of seating opportunities for quiet relaxation. If the road is not constructed, this will provide a sequence to pass through to reach the "wilderness" of the creek zone and the water.

If the road is built, the city should be encouraged to provide an extension of these paths either over or under the road so the creek itself doesn't become totally isolated.

25. Life Cycle: "All the world's a stage; and all the men and women merely players: They have their exits and their entrances; and one man in his time plays many parts, his acts being seven ages."

The local residential area is basically segregated for young families, and even for them, there is an astonishing lack of support facilities. A life cycle balance of ages and settings can not be mandated, but it can and should be encouraged through several means.

1. The absence of local rules or codes which would prohibit in-home rental rooms or set either maximum or minimum housing sizes.

2. Putting off final determination of cluster and lot sizes until residents have been chosen. This will allow extended families as well as old age cottages to evolve. This is opposite of the adjoining speculative neighborhood where lots and most homes are predetermined for small young families.

3. The inclusion of the following facilities and policies:

Patt. 35 Household Mix
Patt. 40 Old People Everywhere
Patt. 86 Childrens Home
27. Men & Women: "The world of 
a town in the 1970's is split 
along sexual lines. Suburbs are 
for women, workplaces for men; 
kindergartens are for women, pro-
fessional schools for men; super-
markets are for women, hardware 
stores for men."

It is guaranteed that the facili-
ties determined in Patt. 19 will 
bring working men into the neigh-
borhood. Likewise, the shops and 
services will probably provide 
some jobs for women. This can be 
encouraged and supplemented by 
the addition of child care, Patt. 
86, within the shared boundary 
zone.

LOCAL CENTERS: "Both in the neigh-
borhoods and the communities, and 
in between them, in the boundaries, 
courage the formation of local 
centers." Patt. 28-34.

30. Activity Nodes: "Community 
facilities scattered individually 
through the city do nothing for 
the life of the city."

There are no existing concen-
trations of activity affecting the 
site. Since the proposed club 
facilities and builders yard will 
be the initial "life of the project," 
they should be used to implement the 
formation of an Activity Node. Their 
siting will then provide the context 
for piecemeal growth of circulation 
and development within the neighbor-
hood.

This will require that the facili-
ties are sited together to form 
an immediate community focus, Patt. 
61, Small Public Squares. Their 
later piecemeal expansion will then 
complete the formation of the node 
and connecting network of paths.

29. Density Rings: "People want 
to be close to shops and services, 
for excitement and convenience. 
And they want to be away from ser-
vice, for quiet and green. The 
exact balance of these two desires 
varies from person to person, but 
in the aggregate, it is the balance 
of these two desires which deter-
mines the gradient of housing den-
sities in a neighborhood."

The entire site is composed of 
30 acres. There is an addi-
tional 8 acres of flood plain to 
the south, but this is unbuildable 
land and was donated by the previous 
owner. Out of the "usable" 30 
acres, there is approximately 8.7 
acres of additional unbuildable 
flood plain. This leaves a poten-
tial gross of 22 acres for housing 
and facility development.

From statistical analysis of 
the potential neighborhood and 
inter-neighborhood facilities, I 
estimate that approximately 30% of 
this land will be necessary for 
their development. This allotment 
is more than adequate, especially 
considering the potential of flood 
plain for public open land and 
recreational use.

This calculation allows a net 
of 14 acres for housing. Consider-
ing the density of the adjoining 
neighborhood, (3 units/acre), per-
sonal amenities to be provided, and 
land use/cost efficiency, I esti-
mate an overall average density of 
7-10 units per acre is appropriate.

(Note: See size determination for 
simulated cluster in second design 
proposal, Housing Cluster.)
Housing: "Around these centers, provide for the growth of housing in the form of clusters based on face to face human groups."

Patts. 35-40

35. Household Mix: "No one stage in the life cycle is self-sufficient."

The regional balance of households is approximately 50% families, 20% couples, and 30% singles. As already discussed under Patt. 26, Life Cycle, this mix can be encouraged through several means. Additional provisions can be made when the number of housing applicants exceeds those needed for a cluster. If there are no personal preferences, the mix chosen should reflect the local ratio.

36. Degrees of Publicness: "People are different, and the way they want to place their houses in a neighborhood is one of the most basic kinds of difference."

Due to the development of the activity node and density gradient, portions of the site will become more active than others. The types of housing and the paths connecting them should reflect this.

To provide a basic range, we can identify three types with an approximately equal demand.

1. Rowhouses, Patt. 38, forming a major continuation of pedestrian paths leading from the activity node.

2. House Clusters, Patt. 37, linking the activity node and row houses with the quieter parts of the site.

3. Less dense clusters, entirely isolated from traffic and located on cul-de-sacs and twisting pedestrian paths.

When equated with the determined density gradient, the following scenario appears:

<table>
<thead>
<tr>
<th>Summary Table</th>
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<tbody>
<tr>
<td>Gross Area</td>
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<tr>
<td>- Unbuildable Land</td>
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<tr>
<td>- Gross Potential</td>
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<tr>
<td>- Facility Development</td>
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<tr>
<td>= Net Housing Potential</td>
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<tr>
<td>X Gross Average</td>
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<tr>
<td>= Total Population</td>
</tr>
</tbody>
</table>
37. House Cluster: "People will not feel comfortable in their houses unless a group of houses forms a cluster, with the public land between them jointly owned by all the householders."

Cluster membership defines the second level of ownership within the neighborhood. While each cluster resident will personally own and maintain his residence and private garden, he will also share ownership and maintenance of some common cluster land and facilities. Experiments have shown the best level of social interaction is gained when clusters accommodate 5 to 8 households. For the denser row houses, Patt. 38, around the activity node, the higher range is recommended for the physical definition of common land.

This framework will provide for +/- 5 row house clusters and +/- 14 house clusters on the site. For a more detailed description of their development, see the second design proposal, A House Cluster.

40. Old People Everywhere: "Old people need old people, but they also need the young, and young people need contact with the old."

According to the normal age distribution, there should be approximately 5-8 old people for every 100 residents. This means that with an estimated neighborhood population of approximately 400 persons, there would ideally be 20-30 persons over 65. Out of these +/- 10 people will need some nursing and help with daily chores.
The Patterns Life Cycle and Household Mix will help to provide for those who are able and wish to live alone. However, there will eventually be a need for a group household for those ten who need some care and wish to remain in the neighborhood.

A scenario could picture a large house of approximately 3,000 to 3,500 sq. ft., built according to Pattern 75, The Family. It will provide private realms for ± 2 couples and six individuals with common space for communal functions and social intercourse . . . eating, playing cards, gardening, watching TV, etc. It could be staffed by part-time help and a visiting nurse.

Old people, particularly, need exposure to community activities and people, especially children. Thus, the home might be located with the shared facilities in the neighborhood boundary. If possible, it could ideally be located with the children's home, Patt. 86, and the neighborhood health center, Patt. 47.

**WORK COMMUNITIES:** "between the house clusters, around the centers, and especially in the boundaries between neighborhoods, encourage the formation of work communities." Patt. 41-48.

44. Local Town Hall: "Local government of communities and local control by the inhabitants will only happen if each community has its own physical town hall which forms the nucleus of its political activity."

The neighborhood council as well as the inter-neighborhood organization will need an indoor meeting area complemented by an outdoor gathering place. Since the scale of the project will only call for infrequent use of these meeting rooms, they should be combined with the initial indoor club facilities as a scheduled multi-purpose center.

This step accomplishes several goals:

1. It lowers the economic impact of both facilities.
2. It immediately establishes the meeting area at the major activity node.
3. The public square, necessary for node development, will double as an outdoor forum for the gatherings. This will reinforce the concentration of activity and add to the "life" of the square.

The scenario for the hall could be no more than a large room surrounded by ancillary spaces. The demand, determined in Patt. 14, 15, and 19, is based on an immediate catch basin of 1200 people or approximately 300 families. With a maximum 100% membership and a one-to-six representation, the inter-neighborhood council would be comprised of 50 persons. On this basis, a room of approximately 700 sq. ft. (14 sq. ft./person) would be sufficient.

However, to accommodate other demands, Patt. 72, Local Sports, a slightly larger facility, should be planned. To allow indoor activities such as dances, ping pong, etc. approximately 1,000 sq. ft. will be necessary.
A use scenario might develop as follows:

**Daily A.M.** Ping Pong; Indoor Recreation

**Friday A.M.** Ladies Club; Pitch in Buffet

**Friday P.M.** Teen Dance

**Tuesday P.M.** Council Meeting

**Wednesday P.M.** Poker Club

**Thursday P.M.** Weight Watchers; Health Club

45. **Necklace of Community Projects:** "The local town hall will not be an honest part of the community which lives around it, unless it is itself surrounded by all kinds of community activities and projects, generated by the people for themselves."

Being located on the public square, the town hall is automatically in the midst of community activities. During later development, however, it might be desirable to provide a few small leasable spaces! These would lease on a short-term basis and provide a seat for neighborhood projects, political campaigns, elections, etc. When unoccupied, they might be used for short-term sales programs or small meetings. Two or three separate spaces of about 300 sq. ft. each should be sufficient.

These should be located either directly on the square or on a major pedestrian path leading to it. Close proximity to the meeting hall will be a major emphasis.

47. **Health Center:** "More than 90% of the people walking about in an ordinary neighborhood are unhealthy, judged by simple biological criteria. This ill health cannot be cured by hospitals or medicine."

The local health center will be another service provided by the inter-neighborhood organization. This center, far from being an isolated medical entity, would actually work in conjunction with the recreational facilities. At the neighborhood scale, it might be no more than a small office with one full-time nurse. Her duties would include the following:

1. Part-time care of the elderly in the group home.
2. Making house calls upon residents who need temporary or emergency help.
3. Organizing family fitness programs and encouraging physical health. Example: A neighborhood weight control clinic for housewives, with scheduled recreational/social events.
4. Day-to-day counseling and treatment of minor problems in office. A small office of 400 sq. ft. would be appropriate for the above activities. As the emphasis is on community health, not patient sickness, the facility should have a strong physical relationship with the pool and town hall as well as the elderly group home.

48. **Housing in Between:** "Wherever there is a sharp separation between residential and nonresidential parts of town, the nonresidential areas will quickly turn to slums."

The activity node and later commercial facilities to be developed in the neighborhood should have housing mixed in. Due to the desired density in this area, homes should take the form of second story units, when possible, with shops beneath. This will reinforce both the ground level activity and the activity node. Individual ownership will contribute to this solution. Yet, it is estimated that a minimum of five homes are necessary in the public square and surrounding commercial area for the activity node to feel "lived in."
LOCAL ROADS AND PATHS: "between the house clusters and work communities, allow the local road and path network to grow informally, piecemeal"

49. Looped Local Roads: "Nobody wants fast traffic going by their homes."

50. T Juncions: "Traffic accidents are far more frequent where two roads cross than at T junctions."

51. Green Streets: "There is too much hot, hard asphalt in the world. A local road, which only gives access to buildings, needs a few stones for the wheels of the cars; nothing more. Most of it can still be green."

Ideally, all housing should be located on roads serving a maximum of fifty cars. This means any one road should service no more than twenty-five homes preferably less. (*Calculated at 1.5 cars/home plus .5 cars for guests.)
The implications are as follows:

1. Limiting access to Burgdolt Road will require that southern residents travel through the site. This means an on-site feeder road is necessary. (25' according to code)

2. All other roads should be looped. That is, they are either cul-de-sacs or designed in such a way as to eliminate short-cut traffic.

3. All intersections should be three-way T junctions.

4. All roads except the feeder should be constructed as green streets. These will be fifteen feet wide, constructed of upturned hollow concrete block and filled and mortared with dirt and sand. After initial grading, the blocks could be laid by residents if they wish, at a reduced housing cost.

5. The Green Streets should be embellished with Pattern 103, Small Pkg. Lots, to compensate for on street parking.

52. Network of Paths and Cars: "Cars are dangerous to pedestrians; yet activities occur just where cars and pedestrians meet."

54. Road Crossing: "Where paths cross roads, the cars have power to frighten and subdue the people walking, even when the people walking have the legal right-of-way."

57. Children in the City: "If children are not able to explore the whole of the adult world round about them, they cannot become adults. But modern cities are so dangerous that children cannot be allowed to explore them freely."

The green streets described in Patterns 49 and 51 will also double as pedestrian paths; traffic densities will be low and they will tend to be pleasant. Even so, a separate path system should be developed crossing the green streets and feeder road at right angles. These paths can connect places where the automobile is prohibited...the public square, the creek zone, the common land of house clusters, etc.

Additionally, whenever these paths cross the main road, they should be raised one foot above grade and clearly visible on either side.

PUBLIC OPEN LAND: "in the communities and neighborhoods provide public open land where people can relax, rub shoulders and renew themselves;"

61. Small Public Squares: "A town needs public squares; they are the largest, most public room, that the town has. But when they are too large, they look and feel deserted."

As noted before, the activity node, town hall, etc... all need a public square as their exterior counterpart. There are two primary basis for sizing this space:

A. Minimum Size - The square should be large enough to accommodate crowded outdoor gatherings as well as indoor meetings at the town hall. With an estimated maximum crowd of 100 persons at 15 sq. ft./person,* the square needs to be at least 1500 sq. ft. (*determined appropriate for people in a "community" situation.)
B. Maximum Size - The space should be small enough so that it appears lively at almost any given time. According to statistics provided in Patt. 123, Pedestrian Density, this allows 150 to 200 sq. ft. for the average number of occupants.

Since the square will be one of the first design priorities, its density needs to be calculated on the basis of initial construction. Thus, an average occupancy of ten people* at 200 sq. ft./person allows a maximum size of 2000 sq. ft.

*Occupancy was calculated assuming 3 square "residents" or facility employees and 7 visitors or pass-throughs will be in the square at most times. This doesn't take into account peak periods, but it does allow the square to maintain its identity and activity at all times.

64. Pools and Streams: "We come from the water; our bodies are largely water; and water plays a fundamental role in our psychology. We need constant access to water, all around us; and we cannot have it without reverence for water in all its forms. But everywhere in cities water is out of reach."

Pigeon Creek, located within 700 ft. of the south and east property lines, is the major body of water affecting the site. Due to the size and nature of the creek, its flood plain, and its regional associations, development should be limited to that described in Patt. 24, Sacred Sites, and a general clean-up.

Within the site itself, there are several "local" drainage patterns that should also be respected.

First, there are three minor streams, full only after rain. During site development, these should be reinforced, when possible, by pedestrian paths and public open land. Those on the east, embellished by Patt. 60, Accessible Green, and Patt. 68, Connected Play, can greatly enhance the neighborhood boundary. If possible, paths crossing this zone should bridge these streams. This will reinforce Patt. 53, Main Gateways, and help provide a transition between the neighborhoods.

Second, there is the catch basin located near the center of the site. This area is flood plain and has occasionally held water during spring thaw. To prevent further erosion of this land, it should be immediately reforested. It can be lightly developed with minor paths and a few picnic settings to again complement Patt. 60, Accessible Green.
the birth of a neighborhood
The Birth of a Neighborhood
Design Proposal, Program and
Schedule of Activities
Daniel Ray Breivogel
Winter, 1979
College of Architecture & Planning
Ball State University
Muncie, Indiana
PROJECT STATUS: The past three months have been spent exploring the works of Christopher Alexander and attempting to understand the design process inherent in "The Timeless Way." As relative to my project, the design of 150 multi-family housing units, the patterns described in "A Pattern Language" have been analyzed and applied with major emphasis to date on the first 92 patterns. As described by Alexander, these are large scale patterns which can not be "designed or built in one fell swoop," but will be generated by piece-meal growth with each individual building act doing its part to create the whole! Unfortunately, this is totally contrary to the current process of the design profession and as a result I have been caught up in a derivative exploration comprising several stages!

First, the initial project concept, the construction of a housing development in the suburbs, was accepted as valid. As I later found, this was a mistake! Proceeding from there, I attempted to apply the considered patterns (see Appendix) to the project with the expected result being a "designed or built" neighborhood! Although contrary to the process, this was viewed as a necessary compromise due to the studio environment and the expected thesis result! As I later found, after much frustration, this can be done, but only superficially with the result being absent of the desired qualities.

At this point, I had comprised an idea of, or in architectural terms, a program for a neighborhood. This told me what, if completed in entirety, the project must contain to function as a healthy or total environment!

The next stage comprised re-analyzing the "program" in terms of sequential patterns with the emphasis being on sequence and scale of application. At this point, upon evaluation of a few patterns initially skipped over, I found the chosen site was in direct conflict with one of these! I had initially accepted the existence of suburbs as valid and proceeded from there, whereas the language would have encouraged only road-side housing in the area. Acknowledging this, but accepting the reality of the situation, I proceeded as before, defining the project as a neighborhood.

According to the initial patterns dealt with describing neighborhoods and their boundary conditions, the first major issues would be the entrance and surrounding boundary. This area would contain functions common to both my project and the adjoining neighborhood. As these functions have specific requirements; the boundary must be large enough to contain them, it seemed the first step would be to design them! Thus I proceeded to attempt a design solution for these facilities. They comprised all functions previously deemed necessary, but which would either take both neighborhoods to support or the provision would be the only possibility of instilling them in the existing neighborhood. At this stage, another compromise in the process was granted with the design taking place on a model (a substitute for site), and on paper.
This too was contrary to "The Timeless Way," for inherent in the process is design on site with paper being only a recording tool! Nevertheless, it was accepted as a studio restriction. Once again, after much thought and frustration, I came to the conclusion that that was also a superficial effort. I was designing support facilities for a neighborhood which didn't as yet exist! The traditional master-builder would never have done this.

After re-evaluation of the project and the process, it seemed there were two alternatives which, though apparent from the beginning, were elusive in their implication until now.

1) Utilize the pattern language as nothing more than a lot of good ideas and apply them when possible, essentially ignoring the philosophy. Generally speaking, a typical design process with the language being nothing more than a reference book!

2) Adhere to the process strictly as an experimental exploration of a design alternative! This, I believe, is where the value of the exploration lies, because, as I have found, it is otherwise superficial!
DEVELOPMENT PROPOSAL: Choosing the latter alternative, I believe the project must be approached as a traditional master-builder would, putting myself in his shoes, analyzing existing needs, and proceeding in the timeless way! This process is described in detail in "The Production of Houses" by Christopher Alexander with specific guidelines proposed for its implementation today. This text was and will be used as a model for further design development.

The first step is analyzing the actual immediate needs of the site in physical terms. This meant asking myself what would actually be the first facilities I would build if I were an architect-builder as described by Alexander. This comprised the builders yard; a base for construction, a center for the community, a place to meet, and a home base for the architect/builder/developer serving the area.

"The builder's yard is not an independent, separate thing, which precedes the full-fledged process of planning, design, and construction, but itself embodies the process and its principles, to the greatest extent possible, so that it shows by example, what the process is, what it can do, and what it should aspire to be!" Christopher Alexander

During or after the design of the builders yard, whichever seems appropriate at the time, the general size and location of the initial 2 or 3 "model" or "test" housing clusters can be determined. No more need be considered at this time.

The above proposal is a far cry from the neighborhood center initially envisioned. Although it will be necessary at some point in time when the site has been fully developed, it need not be designed now. I will provide for it by leaving physical space in the boundary zone (as determined by previous explorations), but its design and construction will be a gradual process growing out of the expanding needs of the growing population of residents. Thus, the builders yard will grow into the initially envisioned complex naturally.

At the point that this concept was correctly established in my mind, I realized that I was now dealing with a complex of comprehendable scale in terms of the design process of the timeless way.
Builders Yard - Outdoor facility for safe storage of materials, equipment, etc., and development of building techniques - 4000 sq. ft.

Workshop - Internal storage as well as place for manufacture of building components - 900 sq. ft.

Public Square - Outdoor meeting place; activity node - 3600 sq. ft.

Town Hall - Community facility to instill belonging from the beginning. A small meeting room with alcoves for indoor recreation (table tennis and pool), a small kitchen, a small office, restrooms, shower and storage - 2000 sq. ft. with adjoining pool, 1500 sq. ft. and playground.

Architect's Office and Workshop - 300 sq. ft.

Architect's Home with Adjoining Rentable Room - 1400 sq. ft.

design on site during scheduled trips. The process will be recorded photographically and verbally with the design being recorded on paper utilizing an on-site transit to maintain degree of accuracy and thus integrity in the translation.

It seems the most natural step forward would now be to implement the process fully by laying the design out on the site itself. Being realistic, this is the only way to really deal with the issues; to remove myself from the confines of assumptions and plan drawings and actually design on-site, using stakes, string, and anything else necessary to help visualize the built result. I shall begin by defining the complex as a whole and then designing, in detail, the individual buildings. The following schedule is an attempt to order the sequence of decisions to be made in relation to immediate importance. (The process calls for each issue to be resolved and designed in its entirety before proceeding to the next!) I call it an attempt, because I won't feel entirely confident in the precise sequence until I am actually standing on the site, questioning myself as to what the master builder would consider next. It very well may be that main entrance is a prelude to public square or vice versa, depending on the very special site influences affecting the location of each!

I expect to complete the design of the complex and partial design of the individual buildings in the next two weeks. If successful, the remainder of the quarter will be spent familiarizing myself further with the issues and their sequence while in Muncie and completing final
SCHEDULE OF EVENTS:

**Issue** - Where, in general, to put initial complex.
**Language** - Site repair, main entrance, main gateway, small parking lots, small public square, activity node. Completion date - December 24.

**Issue** - Relation of parts to whole. Locate, roughly, the locations of the yard, its workshop, the office, my home, and the local town hall in relation to above decisions.
**Language** - Main entrance, degrees of publicness, activity node, main building, number of stories. Completion date - December 26.

**Issue** - Begin to define the individual buildings and outdoor spaces by staking off smaller pieces of land.
**Language** - South facing outdoors, positive outdoor space, wings of light, connected buildings, intimacy gradient. Completion date - December 28.

**Issue** - In relation to above, define the spatial volumes in more detail.
**Language** - Half hidden garden, entrance transition, car connection, hierarchy of open space, courtyards which live, intimacy gradient. Completion date - December 30.

**Issue** - Once buildings are roughly laid out, give the public square more detail.
**Language** - Arcades, building fronts, something roughly in the middle, stair seats, family of entrances. Completion - January 1.
designing on site
Background and Preparation:
According to the previous design proposal, this was to be a first attempt at designing on site; starting from scratch, eliminating preconceptions, and responding to specific issues in the manner of the historic master builder! In preparation, I acquired a bundle of 4 foot wood lath, several balls of string, and some surveyors flagging. With these tools as my conceptual design aids, I hoped to be able to visualize, on site, the complex described in the preceding program.

The Design: December 26: A chilly day, but sunny! Jim Wilkinson and I arrived at the site at 7:30 A.M. We were rather anxious, not being quite sure what we were doing there! Following the language, we roamed the site, mentally recording the views, wondering where to begin. At this point, we were at a slight disadvantage, having previously designed solutions to several issues on paper.

To begin with, it had originally seemed natural to place the community focus, the public square, on the hill-top to the North; this was the highest elevation on the site! Thus, we began by exploring this area. True, it was the highest point; you could view the entire site, but it also provided a continuous backyard view of the tract homes lining the western edge. Additionally, it was far from the existing access road! Previously, this wasn't a problem when the entire complex was to be built at once!

Wondering what to do, we meandered about, searching for a solution. Since the square was to be a focus for future development, we decided to put ourselves in the role of new arrivals. We walked into the site on the boulevard, looking for the ideal loca-
tion. When we reached the property line, the solution appeared, almost too simple to be real! Directly in front of us, at the base of the hill was a nice, fairly level, piece of ground. From this area, and this area only, the view of the tract homes as well as the southern portion of the site was hidden. With the hill wrapping around two sides, it was almost a space in itself! It would require the minimum extension of road and utilities and would appear ideally at the junction of the two neighborhoods.

To get a grasp on the implications, we totaled the programmed square footage (inside and out), and paced off some rough dimensions.

We began the design with Main Entrance and Small Parking Lots:

With the existing boulevard being the only context to work with, we again put ourselves in the position of a motorist. The main entrance would certainly need to be highly visible, a focus for the entry drive. We decided on a central location and then addressed the issue of parking.

First, we bordered the complex on the road, perceiving main entrance as a pedestrian entity only. Under this situation, the parking was off to both sides. We staked it out, but it appeared awkward and too far away. Next, still perceiving main entry as pedestrian access to the square, we wondered how far from the road it could be located and still be perceivable by auto. This required a physical definition.

After discussing it and making mud sketches, we decided "Main Entry" would be a two-story passage between buildings; a distinct passage that would be observable from the road! We placed two stakes in the ground, moving them closer and then further apart until it felt just right! Then, Jim stayed put and gradually backed away from the road while I moved to the boulevard and played the motorist. With my eyes half closed, visualizing buildings in place of stakes, I halted him at what I felt to be the limit of maximum impact. Facing off the distance, we found we had room for both parking and a median in between.

After defining these spaces, we went through a trial and error process of locating the vehicular entry.

After several efforts, we placed a parking lot entry at either end. The solution developed an equal relationship to the separate neighborhood gateways, provided an ample circulation loop, and, for the new arrival, created an identifiable "Circulation Realm." Unfortunately though, at this point the parking lot (12 cars), still seemed too overwhelming. As we had already tried separate flanking lots, we knew that wasn't the answer, so what to do now?
The obvious solution was to somehow reduce the apparent size. We decided on a planting/waiting/drop-off area in the center. After staking it out and gradually widening it to twenty feet, the effect finally seemed right!

We were now ready for the square: Small Public Squares, Activity Node, Main Building, Number of Stories.

First, to complete the Main Entrance, we gave it depth. Placing two more stakes and stringing them out, we arrived at approximately 15 to 20 feet. Seeing this as a two-story space, we decided on an overhead trellis to bring the scale down (Sheltering Roof). At this point, we were beginning to define three-dimensional spaces!

Now, how big should the square itself be?

We talked about the program, the neighborhood, and the activities that would be accommodated. This wasn't to arrive at a static "size" but rather to perceive a "feeling" of what needed to be accomplished. It was decided that to make the square a true "place" within the given suburbia, it needed the definition of two-story buildings. While trying to visualize these, Jim, with a stake in his hand, backed away from the main entrance until I told him to stop. Reversing positions, he arrived at similar conclusions. At approximately 40 feet, we had a public square, surrounded by two-story buildings within a given context, and it felt comfortable. We were so amazed that we removed the markers and rescaled the square with several different people. To our own wonder, all efforts came within five feet of our original conclusions.

Now to locate the individual activities: Degrees of Publicness, Main Building.

Beginning again at the entry, we pondered on future circulation patterns and the scenarios of various arrivals. Several conclusions were drawn:

1) Initially, most newcomers would be interested in the building process and the housing concepts. This would mean that the architect's office and the construction workshop would need to be highly visible and easy to find... right on a main circulation route.

2) The recreation building/town hall would serve as "Main Building." It will belong to all of the people, all of the time, and will thus be the most important social space. Additionally, it will draw the most traffic, with people coming and going at all times.

3) The builder's yard and the architect's home are minor spaces. While the home itself should be exemplary and front on the square to lend whatever degree of activity and enclosure possible, "where" isn't particularly important. Likewise, the builder's yard will be a noisy, dusty place and thus should probably even be completely separated from the square.

On the basis of these conclusions, we located the office and workshop on either side of the entrance, the builder's yard being behind the workshop and the home connected to the office. Then, the community center was placed to the southwest of the square.
We began with the home and office, shaping the buildings and defining the outdoor spaces at the same time. We staked these as physical entities, dealing only with rough square footages; the major criteria being as much southern exposure as possible and a maximum twenty foot building width.

Next, we addressed the community center and its adjoining outdoor spaces.

According to South Facing Outdoors, we wanted the entire square to be bright and cheerful all year long. Thus, we located the town hall to the west, giving both it and the square southern exposure, and eliminating dark northern spaces. Then, to keep the square’s southern edge from becoming a void, it seemed natural to place the swimming pool and playground there.

We staked out these spaces and adjusted them until each had the proper exposure to the square. Then, to complete the enclosure, we visualized a low wall of some sort with an entry gate between pool and square and several trees on the north edge of the playground. These features would provide some shady sitting areas in summer and yet allow plenty of sun in winter. Additionally, they seemed a rather nice contrast to the sharp two-story definition of the other three sides. Also, this rather open, yet structured definition would enhance pattern 114, Hierarchy of Open Space.

Finally, to complete the playground and pool, according to pattern 106, Positive Outdoor Space, we located the bathhouse to give both physical definition. After staking it out, we further defined the pool deck, located a wall around it, adjusted the pool to the natural topography (pattern 104, Site Repair), and defined the deep water (pattern 64, Pools and Streams).

The square was now beginning to come to life! Everyone involved could now sense its being, its intensity, its character, and its quality! Design became easier and easier!
Now to add some detail and refine the square a little further: Arcades, Something Roughly in the Middle.

We began back at the parking lot. It seemed natural to extend the builder's yard along the eastern edge. This sharpened the definition of parking as a "space" and would help block winter winds. Then, to provide shelter and scale down the two-story building fronts, we placed an arcade along the entire length. According to the principles of "Sheltering Roof," we saw this as a nice low arcade, one where you can reach up and touch the roof.

Then entering the square, we continued the arcade area in from of the office, workshop, and town hall. This created a nice transition between building and square, especially as it widened here and there to make room for tables, chairs, and outdoor work spaces.

Finally, we placed a fountain slightly off center to complement the entry and circulation path around the workshop. We were done for the day!

Conclusions: The square now seems whole and alive! Certainly, there are many more patterns to be dealt with and the project is at its infancy in terms of complexity. Yet, the process is visibly working. At this point, we have made mistakes, resolved some issues too quickly, and even overlooked others. Still, we have designed a comfortable environment with no unconquerable flaws. By following the language, even our early naive errors can be resolved and "repaired" with later patterns, all within the context of what has been previously executed! No need to start over, begin at scratch and try again, just progress with every act responsible to the previous! We have now gained a great degree of confidence. The entire complex can be fully designed and built in all its detail, simply by continuing, step by step, as illustrated before!
a house cluster
Occupant Designed Housing
Cluster Simulation
Design Proposal, Program, and
Schedule of Activities
Daniel Ray Breivogel
Winter/Spring, 1980
College of Architecture and Planning
Ball State University
Muncie, Indiana
Thesis: The purpose of this simulation is threefold:

1. To gain individual design experience in the process of "The Timeless Way" as described by Christopher Alexander.

2. To gain an insight into the concept of cluster housing described below.

3. To provide a comparison of lay-person design vs. architect design when using this process.
THE PROCESS: The basis for this simulation is the pattern House Cluster in *A Pattern Language*, by Christopher Alexander and the model provided by Alexander's Mexicali Housing Experiment. Physically, the concept resembles a condominium approach, but in reality, its process and life are very different.

In this process, the architect assumes an unusual role by today's standards. His responsibilities entail:

1. Identifying the site for the cluster.

2. Organizing the financing which will permit the cluster to be built.

3. Seeking and organizing the families who will form the cluster.

4. Helping the families to lay out the cluster for themselves.

5. Exploring the application of construction materials and techniques suitable for the site.

Physically, the homes will be laid out in a cluster surrounding a common piece of land, owned by all. The relationship to this common land should be strong, with the homes opening to it, not the street. As a result, it will serve as a transition, or social zone, with the homes providing its definition and buffer to the street.

Procedurally, the cluster evolves as a social product with occupant participation the essential ingredient. Everyone will contribute, from the design of the whole to the individual homes. All initial design is done by the group, on site, with the aid of stakes and string. Conflicts are resolved and the project is then built from these decisions. Design proceeds from the initial definition of the common land and the individual's responsibility to it, to the dividing of lots, to the placement of individual homes. In practice, this participation in the cluster design is believed to be essential. The result is that, as stated by Alexander.

"Everyone feels that it is theirs, their decision, that they have created it; and that it is not only theirs, but unique in all the world, their home to be!"
THE PROGRAM: The entire cluster, excluding access roads and neighbor-
hood land, (owned jointly by all Neighborhood inhabitants),
has approximately 25,600 sq. ft.
or 2,351 m² allocated for it.
This was calculated on the basis
of six families with the follow-
ing breakdown per household:

PARKING - 400 sq. ft. or approxi-
mately two cars

HOUSE - 1300 sq. ft. maximum
    ground coverage

GARDEN - 1500 sq. ft.

COMMON LAND - 1067 sq. ft.

Within the cluster, this provides
the following allocation:

PARKING - 2400 sq. ft.

HOUSING - 7800 sq. ft.

GARDENS - 9000 sq. ft.

COMMON LAND - 6400 sq. ft.

Thus, while each family purchases
only 4,267 sq. ft. of land, they
have available to them 6,400 sq. ft.
of common land as well as the
neighborhood property.

The rational for the above
areas is as follows:

PARKING - it was felt that
approximately two personal parking
spaces per home should be provided.
While it is suggested that these
be grouped in two or three areas
to limit and thus intensify access
to the common land, they should
retain a close proximity to the
homes served. Additional guest

and long term parking for boats
and campers will be provided on
nearby neighborhood land.

Housing - The housing alloc-
ation was based on a maximum unit
size of 2,000 sq. ft. While any
one family can build to suit their
needs, all have this 2,000 sq. ft.
potential. This will allow expan-
sion as necessary.

The ground coverage was based
on the desired density in this
cluster area. Due to its prox-
imity to the inter-neighborhood
service and commercial center,
two-story buildings were felt
desirable and will thus be encour-
gaged. In the maximum condition,
the 1300 sq. ft. ground coverage
will only require a 54% upper
story utilization to achieve 2000
sq. ft.

Private Gardens - the garden
size was based on a maximum of:
300 sq. ft. for a private terrace,
15' x 20'; 600 sq. ft. for a chil-
dren's play area or dog run, 15'
x 40'; 600 sq. ft. for a flower
and vegetable garden, 15' x 40'.

Common Land - The area devoted
to common land is based on Alexan-
der's pattern. This was deduced
from the model provided by the
greenbelt planners and is approxi-
mately 25% of land held private.
PARTICIPANT PREPARATION: Several decisions must be made before going to the site. Initially, these entail what size and type of home is desirable. In lieu of a budget, an assumption should be made and recorded as to size; when considering type, either immediate needs or a hypothetical future may be programmed, whatever interests you most! The following groups of patterns describe different households and their basic components. As these will be helpful, you should familiarize yourself with them and choose those pertinent to you.

76. House for a Small Family
129 Common Areas at the Heart
136 Couple's Realm
137 Children's Realm
139 Farmhouse Kitchen
144 Bathing Room

77. House for a Couple
136 Couple's Realm
139 Farmhouse Kitchen
141 A Room of One's Own
144 Bathing Room

78. House for One Person
139 Farmhouse Kitchen
144 Bathing Room
180 Window Place
188 Bed Alcove
189 Dressing Room

In addition, any special programmatic requirements should be considered such as a Home Workshop (157), Rooms to Rent (153), or a Teenager's Cottage (154). Your personal application of these patterns needs to be developed, keeping in mind your budget; i.e., a room of one's own might be a workshop or just an alcove.

Both interior and exterior relationships should be thought about, possibly in the mental sense of a bubble diagram, but notions such as preconceived plans should be disregarded. The design's first responsibility and thus response will necessarily be towards the site and the formation of the common land or cluster as a whole!

While we will not have time to stake out these spaces independently, the basic location and volume of the house will be determined. Thus, one will need to be capable of formulating an idea of internal zoning and interior/exterior relationships . . . What rooms have a close relationship to the common land? To the garden? And what type of relationship? . . . A wall? A window? A porch? Keep in mind this is not meant to be extremely complex at this stage! Yet, when your home is initially staked out, you should be able to point to and tell someone where the bedrooms are, where the kitchen is, and so on!
THE DESIGN: Preceding the arrival of the group, the specific location of the cluster and its access roads will be staked out. Following a brief orientation period, the design effort will begin. For this to be truly a group effort everyone will need to be familiar with the patterns listed below.

Day 1.

8:00, Meet on site for orientation

9:00, Begin group design of common land. Patterns:

36 Degrees of Publicness
37 House Cluster
53 Main Gateways
57 Common Land
69 Public Outdoor Room
98 Circulation Realms
106 Positive Outdoor Space
113 Car Connection
114 Hierarchy of Open Space

This step will begin with a brief discussion of the patterns and their application. Then, as a group, we will roughly define the shape and location of the common land, parking, gateways, and the public outdoor room. These will be staked out and defined with string so we may begin to simulate the feeling of the spaces.

2:00, Choice of Individual Lots.
Patterns:

36 Degrees of Publicness

Here, we will choose individual lots simply by going and standing where we would choose to build. This choice might relate to a desire for privacy, a particular view, or the need for street exposure for a workshop. Conflicts will be resolved and lot lines staked out. This step will probably take some trial and error; moving stakes around and making adjustments in square footage until lots have their correct area and the common land, the appropriate shape.

It should be recognized that this step is totally different from a normal process where lots are fixed by developers, not occupants! As Alexander states,

"The results of this procedure are, first, that the clusters take on a unique character which is the direct expression of the group's wishes and needs; and second, that each private lot is then placed in relation to this unique common land, and itself takes on a unique character, according to its position."

In this process, reality is not governed by paper, but the reverse!

5:00, Placing of Houses on Lots.
Patterns:

105 South Facing Outdoors
106 Positive Outdoor Space
107 Wings of Light
108 Connected Buildings
110 Main Entrance
111 Half Hidden Garden
112 Entrance Transition
113 Car Connection
116 Cascade of Roofs
127 Intimacy Gradient
128 Indoor Sunlight
129 Common Areas at the Heart
This is an extremely crucial step. The individual location of the homes on their respective lots is not a private act, but rather they are placed so as to give the common land a boundary, shape, and coherence! Also, the placing has a crucial effect on the shape and usefulness of private outdoor space. These must be worked out simultaneously! I suggest that at this point we work individually or in groups of two with our neighbors.

Day 2.

8:00, Meet on site and continue the previous step.

11:00, Group review of the houses one at a time, with emphasis on feedback. The review should stress both inherent flaws and the correction potential of the next step.

1:00, Make corrections and detail house response to common land. Patterns:

- 119 Arcades
- 121 Path Shape
- 122 Building Fronts
- 140 Private Terrace on the Street
- 166 Gallery Surround

These patterns complete the process by which each house helps to form the common land. In this step, each home provides a portion of the boundary wall. This should be visible and solid, but yet useable! Following are several rules of thumb which might be helpful:

1) The common land should be protected from parking... by a garden wall, porch, etc.

2) Homes must help create gateways!

3) Boundaries of every lot should be made up of either buildings, walls around gardens, or porches and arcades. All these things make the common land more pleasant!

4) 10% of floor area devoted to porches makes this step easier!

This step should again be conducted with neighbors or individually on the basis of the previous analysis.

2:30, Group Review

3:30, Group Detailing of the Common Land. Patterns:

- 56 Bike Paths and Racks
- 69 Public Outdoor Room
- 102 Family of Entrances
- 125 Stair Seats
- 126 Something roughly in the middle

These patterns complete the common land. Once they are discussed and staked out, the common land and cluster as a whole, are finished. All that remains is the individual detailing and construction of the homes!
social development:
on site group design
Background: As noted in the previous proposal, this was to be an occupant designed housing simulation, on site, according to the "Timeless Way." In the previous exercise, the general cluster location had been determined, as well as the comfortable living distance from the power lines bordering the site. Additionally, a grove of fir trees had been placed in response to the view of the trailer park and to soften the effect of the electric company's right of way. Now, all that remained was to stake out the roads and cluster boundaries to give the participants something concrete to work with!
Preparation: An associate and I went to the site early one morning, two days before the group was to arrive. Where to begin? We walked around the area, trying to visualize what had already been done... the square, the grove of firs, the entrances, etc. Working in a plowed field, this became an important part of the process... the right frame of mind! While doing so, I noticed a young couple riding horses along the tree-lined edge of the site. (There is a horse barn and corral in the field to the east.) Walking over there, we remembered the farmer's tractor path along this boundary; a nice path covered with a large oak canopy and a view of the horses in the opposite corral. At that moment, it seemed obvious that the path should be preserved. If auto traffic was limited to one or two clusters, a green street would be rather nice there. It might even be okay for the horses to continue using it. This would further complement several patterns: Connected Play, Quiet Backs, etc.

Working backwards from there, dealing with Main Gateway and Looped Local Roads, it seemed appropriate to continue the green street along the grove of firs to the main road; the path would have a continuous solid boundary, the firs would make a nice entrance and the street would further remove homes from the power lines. For the sake of definition, we paced off the length of the cluster and continued the loop around the southern boundary. Whether this part would be a green street or just a pedestrian path, we weren't sure yet, but knew an interface between clusters was necessary.

After staking this out and unloading the two hundred 5' tomato stakes we had acquired for group use, we were ready.
Design: Saturday morning, a crisp but clear blue day. The group arrived and we walked everyone around the site, explaining what had been done and what needed to be done. Due to circumstance, we had a no-show and a step-in volunteer. She had no knowledge of pattern language at all and read the program on the site. I wondered how she would fit in.

We began the design with Main Entrance:

Standing as a group on the cluster site, we observed a spectacular view to the South! Although the topography isn't that varied, only from our viewpoint did the entire length of the site unfold; gently rolling hills, a distant wooded knoll, a forest in the background. It was unanimous that the view should be preserved and that it should be part of the experience of Main Entrance.

Thus, we all walked up to the green street to place the entrance exactly. At this point, everyone had ideas when prodded a little, but no one was sure enough of himself yet to try staking out something physical. I suggested everyone pick up two or three stakes and a ball of string. Then they could walk along the northern cluster boundary and place the stakes to frame the view they liked best. Jim, a fellow student, took the first initiative and then everyone jumped in, moving the stakes back and forth until we had the view just right. Then, to preserve our view and define a circulation realm,

Jim went to mark the southern entrance. We remained at the main gateway to line up the view and shouted at him across the site until he had it right.

Next, with sticks and mud as our communication media, we discussed, in general terms, House Cluster and Car Connection:

Things were still moving a little slow. We had an entrance and a circulation realm. We knew that somehow our homes were to be organized around this realm, but how? And the main entrance; was it just for visitors and pedestrians, or would everyone use it?

I explained that everyone's
"Front" door would open off the circulation realm and then brought up the subject of parking. Would group parking be acceptable at this density? . . . Definitely not! Evelyn, our newcomer, suggested general roadside parking at the main entrance with personal parking for each home. Mike, a realtor, agreed, suggesting that everyone would generally make use of the main entrance parking, but it would still be necessary to unload groceries, etc., a little closer to your home. I gave in and we staked out the main entrance parking to accommodate six cars.

At first, it seemed a little big, so we divided it in half and flanked the entrance with it. This way you couldn't see the cars from the circulation realm and the small spaces would be rather nice, tucked away in the fire.

Now, with these issues settled, we started to define the Common land.

This pattern calls for a community space owned and used by all, a finer definition of the circulation realm we had already laid out. Before anyone could discuss any particular requirements of this space, they needed to physically visualize it! I explained, from the program, its approximate size and suggested we start at the main entrance and stake it off.

As a group, we then decided on a comfortable depth for the entrance, since it is a three-dimensional space. While doing so, someone suggested an overhead trellis to complete the framing of the view and everyone agreed! Then, in two groups, we paced out a rough oval terminating at the southern entrance. When the Common land thus became a physical entity, with stakes and string defining its boundaries, things started moving!

Before we could tune the space further, everyone had to know where they were going to live. We discussed Degrees of Publicness!

At this point, to keep the development under control, we didn't stake out lots yet, but picked general locations: Dean wanted to be near the parking to accommodate a home office. Evelyn was in love with the view of the horse farm, and so on. We decided the southern gateway would get the most local foot traffic, people coming and going to the square, to play tennis, etc. Accordingly, Jim and Mike, both activity lovers, located near this entrance. We worked out conflicts and moved back to the common land. Everyone was excited!

Now to fine tune the Common Land, locate the Public Outdoor Room, and stake out lots:

We spent considerable time huddled in a group, discussing Degrees of Publicness again. I explained that although public exposure was already somewhat determined by lot choice, the tuning of the common land could greatly affect the balance of
privacy and exposure. At this point, everyone was reluctant to change what we had and wanted to go on. We determined the southern portion would be the most internally active...volleyball, sand pit, barbecue, etc., then roughly located and sized the public outdoor room in this area. Evelyn and Dean then pointed out that this space wasn't large enough for games, so it would have to swell a little. Conversely, to keep the northern portion quiet, (at Dean's request), it could narrow down and be complemented with trees. Since doing this required adjusting boundaries, we went ahead and staked out lot lines at the same time. This took a lot of doing, pacing out dimensions, getting the sizes right, and at the same time shaping the Common Land. After about one and one-half hours, we had the rough proportions right, but still weren't satisfied. It had been a long day and we agreed to sleep on it.

Sunday morning: Unfortunately, it is windy, cold and overcast. We discussed yesterday's results. We agree that the common land has become too complex, that it was nicer a step before. The fountain is moved to the south activity zone, alongside the play area and outdoor room. The outdoor room is sized and adjusted along with the boundaries near it. We adjust a few more stakes, restring the common land, and it is finished! Everybody is at last satisfied!

Then, within the lots, South Facing Outdoors, Wings of Light, and half Hidden Garden:

The initial concept for this step was that everyone would work with their neighbors in defining their private spaces. Then, since these acts have a responsibility for repairing the common land, they would be discussed as a group. Unfortunately, this didn't work! The participants weren't familiar enough with the language to work alone. For the most part, they didn't know where to begin.

To make the most of it, we regrouped and, going from lot to lot, discussed the basic issues. Without being familiar with the language and without a common understanding of the effect of individual acts upon the whole, we couldn't make much real progress. Before we left, though, homes were staked out but except for a few details, more according to preconceptions than patterns or any sense of priorities.

By this time, we were frozen, wet and muddy! We thus decided there was no sense in continuing. When we got back to the comfort of the cars, we discussed the experience. It was agreed by everyone that it had been a worthwhile two days; an experience no one's going to forget. What surprised me more was that there was no one who wouldn't have enjoyed living in our little cluster; even jokes about what kind of neighbors we'd make!

*The drawing on the cover is an accurate survey of our results.
Conclusions:

1. Considering the time limitations and weather, the simulation was a total success! Lay persons can, in fact, design together with pattern language when given proper guidance. In fact, the fellow students had the most problems because they had the most preconceptions!

2. On-site design, when used in conjunction with the shared language, does produce an acceptable, comfortable and exciting environment. Being able to experience this at such an infant stage of development makes it hard to imagine the complexity and quality of the completed process.

3. Experience is definitely a necessity for the architect-builder trying to guide the development of a real house cluster. As noted by Alexander, the design comes easy; it is learning the language and process which takes time!

   Obviously, building a small scale project, a single house, for example, will provide confidence in using and developing the language. But the key to group design is knowing how to guide the participants. That is the value of simulation.

4. Group preparation is a crucial step which, unfortunately, wasn't possible under our circumstances. For what we tried to do, we should have had at least three group meetings prior to design. These should have been spent discussing the proposed language, the

5. Weather conditions and time have a profound effect upon the ability of the group to function. On-site development should be limited to fair weather seasons, in addition to a maximum five hour limit per day. This is conducive to rational decision-making and off-site reflection.
materials, methods & costs
Pages 50-53 Missing
A Continuation of the Language:
In the same spirit as the earlier "design patterns," a language may be developed to govern the choice of materials and their application; basically, the construction process. The last 50 patterns in "A Pattern Language," provide an ordering basis, with examples, for such a procedure, again a step by step process from foundation to roof to detailing. Actual applications in this area, though, are especially reliant upon the individual master builder and the location and culture he serves. The materials and erection process, all a major part of the design, must be developed through trial and experience, tailoring both to climate, function, and social acceptance. Accordingly, the following concepts are only that. They represent a sort of half baked resolution of several parameters which will provide a basis for me to begin experimentation.
MATERIALS: Pott. 207, Good Materials, is very profound in its implications. It advocates total usage of renewable, low energy, ecologically sound materials. Additionally, these materials need to be suitable to the building/design process. They must be: 1) easily erected (no special skills needed), 2) easily modified for flexibility in design and application, 3) totally congruous with on-site construction.

To this end, I have been researching the application of soil cement. I chose this material for several reasons: 1) It is a low cost, easily adaptable material. The home is literally built from the site. Soil cement can be utilized for floors, walls, and even roofs. 2) It is an extremely low energy product, ecologically sound and available almost anywhere! There is practically no earth not suitable when mixed with proper proportions of cement and sometimes sand. 3) It is a labor intensive, unfinished product which makes it particularly suitable to the self-build concept.

Several experiments have already been made on various applications of this material. In the Mexicali experiment by Alexander, it was successfully used in block form for wall construction. Under the auspices of a United Nations funded study on low-cost self-help construction techniques, several complete soil cement homes were built by low income families in the Appalachian area. Additionally, several universities have funded experiments, primarily because of its production energy savings. The material has proven durable and acceptable to groups ranging from low income to upper-middle class families.
METHODS: As the primary basis of "Good Materials" is to minimize the use of "product" goods and the expensive, depleting supply of wood, I propose a very extensive use of soil cement, illustrated by the following applications. Of course, before building a private home, I would test and develop these ideas, possibly with scale development or maybe a garage or small home for myself.

Floors: There are several possible applications in ground floor construction. First, as proposed by the United Nations Report, it can be mixed and poured, similarly to concrete, to provide a base slab. The slab can then be finished with conventional materials... carpet tile, etc. Second, utilizing a "Cinva Ram" block press, 2 inch tiles can be easily produced and used for either exterior or interior paving. These tiles can either be dyed, left unfinished, or painted, to name a few options.

Another possible material worth investigation for floor construction is lightweight concrete. Although concrete is a high energy material, I recently learned that the new synfuel plants produce a super light, cinder type material as a by-product. This would make excellent filler material.

Walls: Utilizing the same "Cinva Ram" used to produce the paving tiles, structural wall blocks may be made. I feel these are currently the best material. As compared to a rammed or poured wall, blocks allow a great deal of flexibility and eliminate all formwork. Once again, these are labor intensive and can be made by the homebuilder. Additionally, if finished properly, they seem ideal for imprecise, on site design and construction and can be laid up by anyone!

Roofs: When considering roofs, the minimization of wood seems difficult. I feel there are currently two feasible alternatives which need to be further tried and developed.

1. Vault construction: Vaults are particularly suitable to the use of fluid membrane materials such as either a low slump soil cement mixture or lightweight concrete. Alexander has developed several processes utilizing a latticework frame, a resin-coated burlap skin, and a concrete topping. The major problem I see here is social acceptance of the resulting form. Although I haven't actually seen a finished product, I imagine a rather awkward form with a similar finish. I personally love the aesthetics of vaulted spaces, but question whether these variations will be acceptable to the midwestern public. Possibly though, through experimentation and further development, a refined soil-cement technique will surface.

2. Pitched Roofs: As proposed by the United Nations study, a conventional appearing pitched roof can be constructed utilizing a minimum of wood. Conventional rafters are placed, only at a much wider...
than normal spacing. These are then tied together with lattice over which treated burlap is stretched. Then, similar to Alexander's process, soil cement is troweled onto the canvas, resulting in a strong watertight roof. Although the concepts of vaults intrigue me and I intend to pursue it, I feel this technique is probably the most feasible at the current time.

**Finishes:** The real key to self-build soil cement construction lies in the finishes. Take, for example, the walls; the joints have to be aligned, the wall perfectly straight, and the surface smooth and flat. Wrong! If a flexible, easily applied and repaired surface such as stucco and plaster are applied, the rougher the wall, the better! Simple guides (2 stakes in the ground) will keep the walls relatively straight. Then, if the joints are crooked and the surface not smooth, it matters not. The ins and outs will give the coatings something to adhere to and then, even lath is not necessary!

For these reasons, I feel there is excellent potential for owner-applied, troweled stucco on all surfaces. For those desiring a more finished interior look, perhaps a spray technique may be developed to aid the inexperienced.*

*C A stucco spray has been patented with a rubberized additive. This prevents the material from clogging the spray gun and provides a smooth finished surface.

**Costs:** Cost might seem to be an uncontrollable element in a process such as this. After all, the house is not a product; it's not drawn and designed and then built. It is instead continuously being designed and altered during construction! How then, can costs be controlled?  

The answer is simply a further extension of the language. Custom construction need not be expensive as long as costs are measured in terms of processes, not products! Each process is then one step in the linear progression of construction patterns. For example, through experiments, it can be determined how much per linear foot the foundation costs, how much per foot a 10' high soil cement wall costs, etc. Then through statistical analysis it can be determined how much of each process is needed for different size buildings ... x linear ft. of foundation, y ft. of wall, sq. ft. of roof, etc., for a 1200 sq. ft., three bedroom home.

Then, the home-builder can use these guidelines when designing and building his home. If he wants to build it for a certain cost and exceeds the wall allowance, he will immediately know that he will either have to pay more or cut
back on a later process. An excellent accounting system for this process has been tried by Alexander and is published in chart form in "The Production of Houses."

Actual dollars and cents figures for the construction methods I propose are impossible to derive until they have been tried and developed. Additionally, costs will vary depending on the degree of self labor used.

Even so, I feel safe in making a few estimates on the following basis.

1. A conventional wall, 2 inch by 4 inch studs, 3/8" plywood, 5/8" interior gyp. bd. and exterior siding will cost at least $1.00/ sq. ft., not counting insulation, paint, or labor.

2. A stucco finished, soil cement double block wall with a four inch airspace for insulation and utilities will cost no more than 40¢/sq. ft., not counting labor. This is based on published expenses of five cents per block and current prices for pre-mixed stucco.

3. Even non-union skilled labor usually associated with home construction is extremely expensive. Using self-help and unskilled labor, I estimate a cluster of six homes would require the services of only two skilled craftsmen. (1 full time carpenter and an occasional plumber, electrician, etc.) Additionally, an architect serving in the role previously described could supervise the construction of at least twenty homes per year. Thus, his fees would be absorbed with little impact.

4. Utilizing the cluster concept, land is certainly used more efficiently at higher densities than current single family housing concepts.

Considering the above facts, I certainly feel safe in estimating a cost at least comparable with that of multi-family construction. That is, at $34/sq. ft. compared to $42/sq. ft. for a single family home!
METALIBEC LTD. takes pride in presenting this manual of information about the portable Cinva-Ram Block Press, a simple, low-cost machine which produces building blocks and tiles from common earth.

Evolved by The Inter-American Housing and Planning Center (CINVA) in Bogota, Colombia, the all-steel Cinva-Ram Block Press consists of a mold box in which a slightly moist earth and cement or lime mixture is compressed by a hand-operated piston and lever system. The press weighs only 128 pounds and is thus a portable tool for the do-it-yourself construction of small houses, farm buildings, walls, floors, patios, and walks.

Rock-hard, semi-hollow or solid wall blocks having laid-up dimensions of 4" x 6" x 12", and tiles having laid-up dimensions of 2" x 6" x 12", have many advantages over most building materials. Unlike concrete blocks, they can be removed immediately from the press and stacked for curing without the use of a pallet. They are ready for laying in about 8 days after making. They are uniform, having sharp, precise dimensions and smooth surfaces. Blocks of even the lowest densities have structural qualities superior in many ways to common burnt brick and other masonry materials. Blocks of heavier densities need no surface protection. They may be painted.

In many areas, Cinva-Ram blocks cost only about 1/20 of the price of conventional building blocks if made by the user.

The all-steel machine, tough and durable, is constructed for long and hard use, and except for oiling and ordinary care, to keep it rust-free, maintenance cost can be forgotten.

From its facilities in Bogota, Colombia, METALIBEC LTD., can help to bring adequate, inexpensive housing to you and to millions throughout the world who so urgently need it.

PREPARING THE EARTH
Only the simplest of implements are required to properly prepare the selected earth.

SCREENING THE EARTH
The selected earth must be screened through mesh having openings of about 1/2" square.

ADDING THE CEMENT
Depending upon the intended use of the blocks and the climatic conditions, excellent results can be obtained with 5 to 10 percent cement. After screening the earth, sprinkle the measured amount of cement evenly and mix thoroughly. Generally, a higher percentage of cement will result in a block having greater resistance to erosion, absorption, and abrasion.

NOTE: Lime may be substituted for Cement, but in doing so, double the quantity of Lime used and also DOUBLE the Curing Time of the Blocks or Tiles.

MOISTURE CONTENT
The amount of moisture in the earth mixture is one of the most important requirements. A simple test to determine the correct amount of moisture in the mix is to squeeze a ball of the soil mix in your hand. If the ball can be broken in two without crumbling and without leaving any moisture on your hand, the moisture content is correct. Should the mix be too dry, sprinkle small amounts of water evenly and mix thoroughly until it is of the right consistency.
SELECTING THE EARTH
Most earth, when reasonably free from vegetable matter, will make good compressed earth blocks and tiles. Select earth on your property which requires the least amount of digging to meet this specification. The earth from foundation or basement excavations will usually be suitable.

STEPS IN TESTING YOUR EARTH
1. Fill a straight-sided glass jar about one-third full of earth.
2. Add water to fill jar about two-thirds full.
3. Cover jar and shake vigorously until all of the earth is in suspension.
4. Allow earth to settle until you can see the various particle-size divisions. (About 30 minutes.)

Although any earth will make a suitable block, one should attempt to use earth which will make the best block. This is made from earth having particle-sizes from very fine to fairly coarse. The coarse particles should not be less than one-third, nor more than two-thirds of the earth in the jar. The only earth which is not suitable is earth having only one particle-size. However, it is often possible to add sand to make fine-particle earth suitable.

MOUNTING THE PRESS
The press must be attached to a wooden baseboard for necessary stability.

OPERATING THE PRESS
In order to make good compressed earth blocks and tiles, enough earth mix must be loaded into the mold box to require a hard pull on the handle. Make a few test blocks and tiles to determine the quantity of your earth mix which must be loaded into the press to give you this adequate, hard pull.

There are three basic operations in making the compressed earth blocks or tiles:
1. Loading the mold box.
2. Compressing the mix.
3. Ejecting the finished product.

Detailed Movements
1. Place the handle in the rest position and open the mold box by swinging the cover horizontally until its stop is reached; then fill the mold box with the prepared earth.
2. Close the mold box, skimming off excess earth, and bring the handle to the vertical position; then release the latch.
3. Pull down the handle until it is parallel with the ground. This applies the necessary pressure to form the block. If the mold box is properly filled, this should require a "hard pull".
CURING THE
BLOCKS AND TILES

The instructions for curing Cinva-Ram blocks and tiles should be followed carefully. In general, they are cured similarly to cement blocks or concrete. The moisture in Cinva-Ram blocks must be eliminated slowly, under cover and protected from sun and rain. They should not be stacked upon each other during the first three or four days after making. They should be separated, in single rows away from direct contact with the ground. For the first three or four days they must be sprinkled lightly with water twice a day. On the eighth day blocks may be laid-up in a wall where they continue to cure and gain full strength in about 90 days.

Tiles should not be laid-up until they have fully cured (about 25 days).

NOTE: If Lime is used in making the Blocks or Tiles, Remember to Double the Curing Time.

4. Return the handle to the original rest position, swing cover back and open the mold box.

5. Pull down on the handle in the opposite direction until it is parallel with the ground. This ejects the block.

6a Removing blocks from the press:
Place hands flat at the ends of the block, being careful not to damage the corners or edges and then gently lift the block from the mold box. Place on edge at the curing site.

6b Removing tiles from the press:
Place one flat hand on top of the tile. Keeping the tile and wooden insert together, slide both off the mold box until the other hand can be placed beneath the insert. Place both on edge at the curing site and then gently separate the insert from the tile.

NOTE: One of the greatest advantages of a compressed earth block or tile is that it can be removed immediately from the press without the use of a pallet.

ADJUSTING THE PISTON

In full ejection position the piston head should be level with top of mold box. Continued use of the press or accidental jarring may loosen the two guide angles or force them out of vertical alignment, producing blocks having unequal end dimensions. To correct this, move guide angles by regulating adjustment bolts.
bibliography


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