FIRST TOUGHTS ON THE GROWTH AND
THE PRODUCTION PROCESS OF A GROUP
OF 200 HOUSES

Artemis Anninou Winter 1980

THE 200 HOUSES

The basic unit

The basic unit is a cluster of 8-10 households, which is developed around a piece of land owned collectively by the households, which are part of the cluster.

Each cluster of houses has to be adjacent to a street artery at least on one side.

The clusters of houses have to be located in such a way, so together that 6-8 clusters could form a neighborhood. For each neighborhood some common facilities have to be provided. Preferably they are located eccentricly in the neighborhood, at the areas where each neighborhood touches the other one.

Each neighborhood comprises approximately 50-80 households.

The total of the 200 houses will be divided in three neighbor hoods.

The growth

The 6 or 8 clusters of houses, which form a neighborhood, start to be built simultaneously. The time needed for its completion will be 8 to 10 months. At the time the first neighborhood has reached a fairly advanced level of completion, that means that at least 80% of the building operations have to have been completed, works on the second neighborhood will start.

The building of the 200 houses will be completed in two years.

The production unit

One architect is responsible for the building of one cluster (8-10 houses) to be completed in a period of 8-10 monthes. Each architect has to form a workteam, comprised of 3 skilled workers (masons, carpenters) and 5 unskilled workers and one accountant.

Since the building of the clusters belonging in a neighborhood starts at the same time, at the moment the building process begins, as many workteams as clusters are needed, that is 6-8. Each workteam has to carry through all the building operations for the completion of one cluster, except from electric and plumbing installations, which will be commissioned to a crew of X plumbers and electricians for all the houses.

Each workteam will have to complete 3 clusters (24-30 houses) in two years. Levels of organization for decision-making

1st level:Concerning the whole area under development

Participants: The 6 or 8 architects

Issues to be tackled:Infrastructure (streets, water supply,

sewage, etc.)

Approximate size of each neighborhood
Location of the neighborhoods

The character of boundaries between the neighborhoo Policy for the formation of family groups

2nd level:Concerning the neighborhood

Participants: The 6 or 8 architects

Delegators from the cluster of families (1 from each cluster)

Issues to be tackled: The character of the activity nodes in the neigfborhood

The approximate size of each cluster

The location of each cluster in the neigh borhood

The policy to assign land to each cluster of families.

3rd level: Concerning two adjacent clusters

Participants: The architects, in charge of the two clusters (2)

The families who are going to live in these two (16-20)

clusters.

Issues to be tackled: The character of boundaries between two clusters.

4th level: Concerning a cluster of 8-10 houses

Participants: The architect, in charge of the cluster

The families (8-10)

Issues to be tackled: The needs of each family (sq.meters per household)

The location and the formation of the common land

Choice of individual lot (location)
The policy to assign land owned by each household.(size)

5th level: Concerning the individual household

Participants: The architect

The family

Issues to be tackled: The layout of each individual house

The contribution of each family to

the building of the house.

The operations

1. The families and the architect get together on the site to lay out the boundaries of the common land and its main gates which connect the cluster with the streets and other clusters.

(2 days)

- 2. Families pick up the places they want to be located in the cluster (1 day)
- 3. The architect has to choose the first three houses to be built.

 The choise will be based on the contribution of these houses to the shaping of the common land and its gates.
- 4. The architect gets together with these families on the site and they start laying on the ground the houses.

(3 days)

5. The building operations start, undertaken by 8 workers. Families will contribute.

-excavate and neutralize soil	(3 days)
-place corner stones	(1,5 day)
-place wall fountation	(5 days)
-prepare slab	(5 days)
-place under slab plumbing	(5 days-a plumber and 3helper
-pour slab	(2 days)
-erect columns	(10 days)
-erect walls between columns	(12 days)
	46 days in total (90 days)

6. At this point, since the first three houses have taken their three houses have taken their three definite shape, the next three houses will start to be built.

The architect with the next three families lay their houses on the ground, responding at this time to the already existing houses.

This operation has to be completed at the 46th day.

- 7. The workers will be split into two groups. One group with three members, one skilled worker and two unskilled, continuing the building of the first three houses. At this point the contribution of the families to work for these houses could be increased for two reasons:
 - -there is a lot of left space for theme to work
 - -it is a critical point, since the users can start dealing with the details in their houses
 - -at this step they can perceive the spaces more easily

 The other group, with five members, two skilled workers and three unskilled will undertake the building operations for the new three houses.
- 8. The continuation of the building operations on the first buildings with three workers.

-build perimeter beams	(10 days) 6 weeks for
-door frames	(3 days) roof for 3 bldgs.
-structure of the roof	(14 days)
-roof sheathing	(6 days)
-install electrical circuits	(5 days-1 electrician and 3 helpers)
· -install window frames	(3 days)
· -finishing floors	(6 days) 36145
-install windows	(3 days) forble mont
-install doors	(3 days)
	47 days

Two of the workers move to the other group. One unskilled worker remains to supervise the following operations.

-install plumbing

(4 days-1 plumber, 3 helpers)

-install electrical

(2 days-1electrician2helpers

-finish walls paint and trim

- 9. The building on the new houses starts with 5 workers.

 They repeat the same operations as in #5.

 By the time the work arrives at the stage of erecting walls and columns, the group wii be increased to seven workers.

 These operations will be completed in about 70 days. By this time the first three houses will have to be completed.
- 10.Step 7 is repeated, also step 8 for the second three houses and step 9 for the last houses of the cluster.
- 11.By this time step 8 for the last houses of the cluster has to be completed. 3 workers will undertake these operations.

 The rest will move on for the building of a new cluster.

Before families start expressing their interest for the project, the group of the architects should have made decisions, concerning the location and the size of the first neighborhood to be build, as well as the location of each cluster in that neighborhood. At the time each family decides its participation in the project, has the opportunity to express its own preferences concerning its neighbors, if it is something preorganized. (two or three families want to built their houses next to each other.) In cases, where one family knows nobody, it becomes known to her which are the other families, which are going to live in the neighborhood. In a set time limit, a new family has the opportunity to get to know some of the other families, so that it could be easier for them to decide with whom they want to share a cluster. Each family or group of families can choose the cluster they want to live in. The priority for choice is set according to the order families have expressed their interest. Clusters already filled are out of choice, unless an mutual agreement between two families is settled for interchange. At this step only the cluster can be chosen, not the location in the cluster.

Families will be suggested to proceed on this choice after they have visited the site.

This procedure for each family can not exceed X days.

The building process can start after the first 50 families have committed themselves to the project.

The building of a cluster of houses

8 - 10 houses have to be built in 8-10 months.

The responsibility for the building of the cluster is carried mainly by a professinal group, consisted of an architect, three skilled workers, five unskilled workers and one accountant.

The working power will be enforced by the inhabitants of the cluster. Since in one cluster are going to live forty people approximately, it can be assumed that 50% of them will be capable of offering services during the building process.

Each family has to participate in the construction of their house by putting on an average 30 hours per week over a period of 18-20 weeks. The distribution of the time during the building process can be uneven, according to the needs.

Each family will help two other families on the building, by putting 15 hours of work per week.

These groups of mutual help have to be arranged before the construction starts.

It is important that the distribution of the inhabitants working time is uneven, so that at rush times -when a major operation will take place- more time can be put by them. Also, as the building of one house proceeds less time by the professionals will be put, so that in respone more time by the inhabitants will be offered.

When the families get together with the professional team in order to start building, the following issues should have been decided:

- -the location and the size of the cluster
- -the size of each dwelling (roughly)
- -whether some common facilities will be included in the cluster

Before the construction starts some major decisions have to be made, concerning the location of the main street arteries, the location and the approximate size of the main activity nodes (they mostly include commercial and public facilities). Streets and activity nodes have to be placed in such a way so that they will form the boundaries between the three neighborhoods. The construction will start with 8 clusters of houses, each one comprising 6-8 houses. Each one of these clusters has to be located in such a way, so that it contributes to the physical configuration of the main streets and activity nodes. Also they have to be distributed evenly among the neighborhoods. So, each neighborhood starts being developed at the same time. These first clusters, besides the houses, have to comprise some of the common facilities, which have to be provided in the area. (1 or 2 each one). The first stage of development will take 8 to 10 months. At the time this first stage has reached a fairly advanced level of completion, that is at least 80% of the building operations, the second stage will start. On the second stage 8 more clusters of houses, each one comprising 8-10 houses, will be built. These clusters have to be distributed among the three neighborhoods. The location of these clusters in the neighborhood has to take care of the formation of the secondary streets leading in the neighborhood and of the secondary activity nodes in the neighbor hood. The act of placing these new clusters has to conrespond primarily to the arleady existing clusters. The time for the completion of this phase will be 8 to 10 months. the last stage 8 more clusters will be built completing the physical arrangement in each neighborhood.

Rules for the growth : Concerning

- -The location of the first 8 clusters The density
- -The location of the next 8 clusters
- -The location of the last 8 clusters

These rules have to deal with neighboring between:

- -a cluster and the primary public spaces (they form the boundaries between neighdorhoods)
- -a cluster and the secondary public spaces (in a neighborhood)
- -two adjacent clusters
- -The size and shape of clusters
- -The size and shape of public spaces.

Before the development of any neighborhood starts, some major and definite decisions have to be made, concerning the spatial KKKK organisation of the whole area under development, like the location of the main transportation lines and basic infrastructure, the number of neighborhoods to be built, their approximate size and their location, the character of each neighborhood and the communal facilities that each neighborhood should be provided with, as well as the main public facilities that belong to the whole area and they do not necesseraly belong to any of the neighborhoods.

These kind of public facilities could be handled in such a way so that the boundaries between the neighborhoods could be established.

The development INXXXXXXXXXXIN eighborhood starts with some major XXX small agreements for the major urban structures, for example a XXXX road which crosses the neighborhood XXXX meets the major public square of the neighborhood and is intersect by some other pedestrian s street. These structures should be established XXX at this point to such a degree, so that the overall size, XXXX the approximate shape and the expected character of the place should be known and agreed upon.

Then, the next step is to decide which specific points of these

structures are more important to be developed, so that the structures should be hinted at with the first couple tens of buildings.

So, if two or three structures will be developed, then one or two locations at each one of them should be chosen for actual development, accurate having in mind that the choice of these locations NXX is very important.

After the hinting of these first structures is completed, (in a period of 3-5 months - at the time the NK buildings get their roofs on-), new buildings are added on the same structures, in order to pin them down. By the time the form of these first major structures is established, new structures in the same neighborhood are hinted at and they start being built.

At this stage of the development the overall form of the neighborhood can be considered as pinned down well, so that the development of a new neighborhood starts, XXXXXXXX in parallel with the development of the already existing neighborhood.

The buildings which are added at each point of the development, they either hint on a structure, or pin it down, or complete it. The buildings are not introduced one by one. More than one building is introduced at a time. Yet, the buildings beyond contributing to the formation of the major public structures, they belong to a cluster of houses, whose completion is another aim.

The overall development starts with a low rhythm and then it gets so denser and denser. And this is because as the development goes on there are more and more structures to respond to, complete, and advance.

The phases of development of a major structure are also three: The hinting of the structure, the pinning down of the structure and the completion of the XX structure.

The phase of hinting of a structure includes major aggreements concerning the character of the structure, the size of the structure, the location of the structure, the rought shape of the structure. At this phase the first buildings which will start shaping the structure will start being built.

By the time these first buildings have taken an overall definite shape, (let's say, by the time the roof starts being built), the structure enters its second phase, the phase of beingXXXX pinned down. New buildings in the same structure are introduced, to solidify the structure. By the time these buildings enter the stage of being covered by their roofs, the phase of the pinning down of the structure can be considered completed,. The new phase for the completion of the structure will start.

At this time, when the first structures are already pinned down, new structures will emerge., and start being built.

So, by the time one existing structure enters the phase of completion, a new structure, or more than one structuresXXXXXXXX will start.

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Let's say that the development start with two major structures, S_1 and S_2 . By the time S_1 is pinned down, <code>XWEXXEXXEXXEXXEXXEXXEXEXXEXEXEX let's</code> assume that two more structures, S_3 and S_4 will start being developed. And by the time S_2 is pinned down, assumingly a new S_5 will start. So, there is a time relationship between S_1 and $(S_3 + S_4)$ and between S_2 and S_5 ; but the spatial relationships among them, in terms of

their sequential emergence is between $(S_1 + S_2)$ and $(S_3 + S_4 + S_5)$.

	Foundation, columns,	Roof		Finishing
3-4 houses	walls, beams $3^1/2$	11/2	windows 2	2
5-6 houses	4 ¹ /2	21/2	3	21/2
7-8 houses	5 ¹ /2	3	4	3

H_{N1}

The first stage of the development of a neighborhood (N) is called the hinting of the neighborhood.

By the end of this XXXXXX period, some (2-4) structures of the neighborhood which already have been hinted at by some buildings, they should have passed on the second stage of their development, which is their concrete establishment(pinned down).

X

P_{N1}

At this time the second stage of the development of the neighborhood starts: the neighborhood is pinned down.

At this stage the XX already pinned down major structures are getting completed. Simultaneously, the given situation of the e existing structures generates new major urban structures.

The period of the pinning down of the neighborhood lasts until the newly introduced major structures are into the process of their completion. Also, by the end of this period some new structures will be introduced, WAXXXX most of which will not overcome the stage of hinting by the end of the pinning down of the neighborhood. So, by the end of this stage most of what is going to by built

Then, the period of the completion of the neighborhood starts.

At this stage, some of the structures have to go through the stage of completion, and some through the stages of pinning down

N1 stage of comple and completion.

is already introduced.

H

AXXXX While the first neighborhood is halfway through the stage of its pinning down XXXXXXXXX the development of a new neighborhood will start, which will go through the same stages of development, and so on.

The basic assumptions for a pattern of growth, which has to satisfy the requirements for limited time.

The first assumption is that the building process should start from more than one points.

The third assumption is that each building should be part of a cluster of buildings, each cluster of buildings should contribute to the formation of some major urban structures, and that the tissue of the major urban structures should form a neighborhood.

Each of these entities, clusters of buildings, major structures, neighborhoods, are distinct entities by themselves, but yet, there is an overlapping among them.

The fourth assumption is that the pattern of growth is an overlapping production; that means that a neighborhood starts to be developed, and by the time the overall structure of the neighborhood is well established, but not complete, the development of the n next neighborhood starts, in responding to the already existing situation, and so on. The same happens with the development of the major structures.

The building process, which will produce a considerable amount of houses within a limited amount of time, will follow the rules of incremental growth and the rules of the centering process.

Unlike the S.F. project piecemeal growth, where the largest increment, one to be added at each time, was a building, in this case there will be more XXXXXXXX basic increments concerning different levels of scale to be introduced, more than one, at each time:

The most elementary increment is that of a group of buildings (the number of buildings in each group varries according to different cases.) All the buildings which form the group start being built at the same time, and there are more than one group of buildings introduced at each time through the development process.

Each group of buildings is going to play the same role in the

MEXEXEMPMENT XPRESESS MEX MIX THAT X PLAY START X PROJECT, and this is its contribution to the formation of the next larger increment, which is a major urban structure.

So, the second larger increment is a major urban structure; that could be a main road, a pedestrian street, a public square, a public green area and so on.

A structure is consisted of different groups of buildings, which are going to give the structure its definite shape, after a general agreement has been made for its development.

The groups of buildings which belong to one structure do not start being built at the same time. There is a sequential order that guides

their building according to the rule of hinting-pinning down-completing. Therefore, a group of buildings will hint at the development of one structure, another couple of groups will pin it down and then some other groups will complete it.

Yet, for the pinning down of a structure to strart it is not necessary for the phase of hinting at the structure to be finished. The same is valid for the phase of completion of the structure to start. That means that the buildings, which form the group that hints at the development of the structure, KXXXXXXXX need not be completely finished for the next group of buildings, which will pin the structure down, to be introduced.

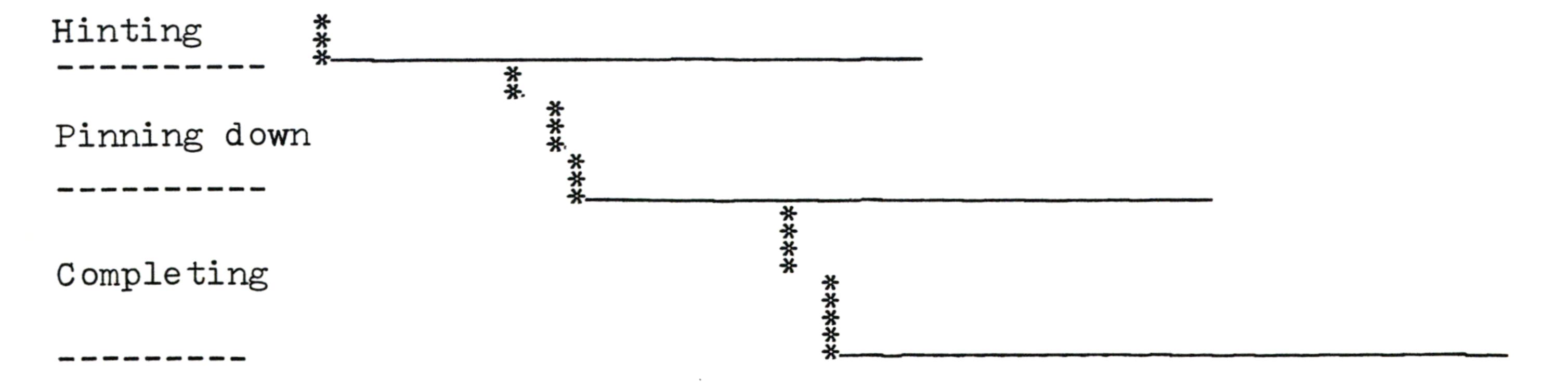
It is like this:

A group of buildings that hint at a phase of hinting structure

Groups of buildings that pin down a phase of pinning down structure

Groups of buildings that complete a phase of completing structure

It is not necessary for all the groups of buildings which will pin down the structure or which will complete it to start at the same time. It can be like this.



The best time for a new phase of development, concerning a structure, to start, while another is going on, is the time when the buildings, which consist the already going on phase of development, have already been adequately defined on the site, so that they can be X considered as part of the existing situation, towards which the next XXXXX phase of development has to respond.

A group of houses to be completed goes through the following stages:

	Laying out-Foundation Columns-Beams-Walls Slabs-Plumbing		Roof Insulation	Floors-Doors Windows Plumbing-Elect.	Finishing	
	A		B	C	D	
3-4 houses 4.6 houses 5-8 houses	4 1/2	nonths	1 1/2 2 1/2 3	2 3 4	2 2 1/2 3	

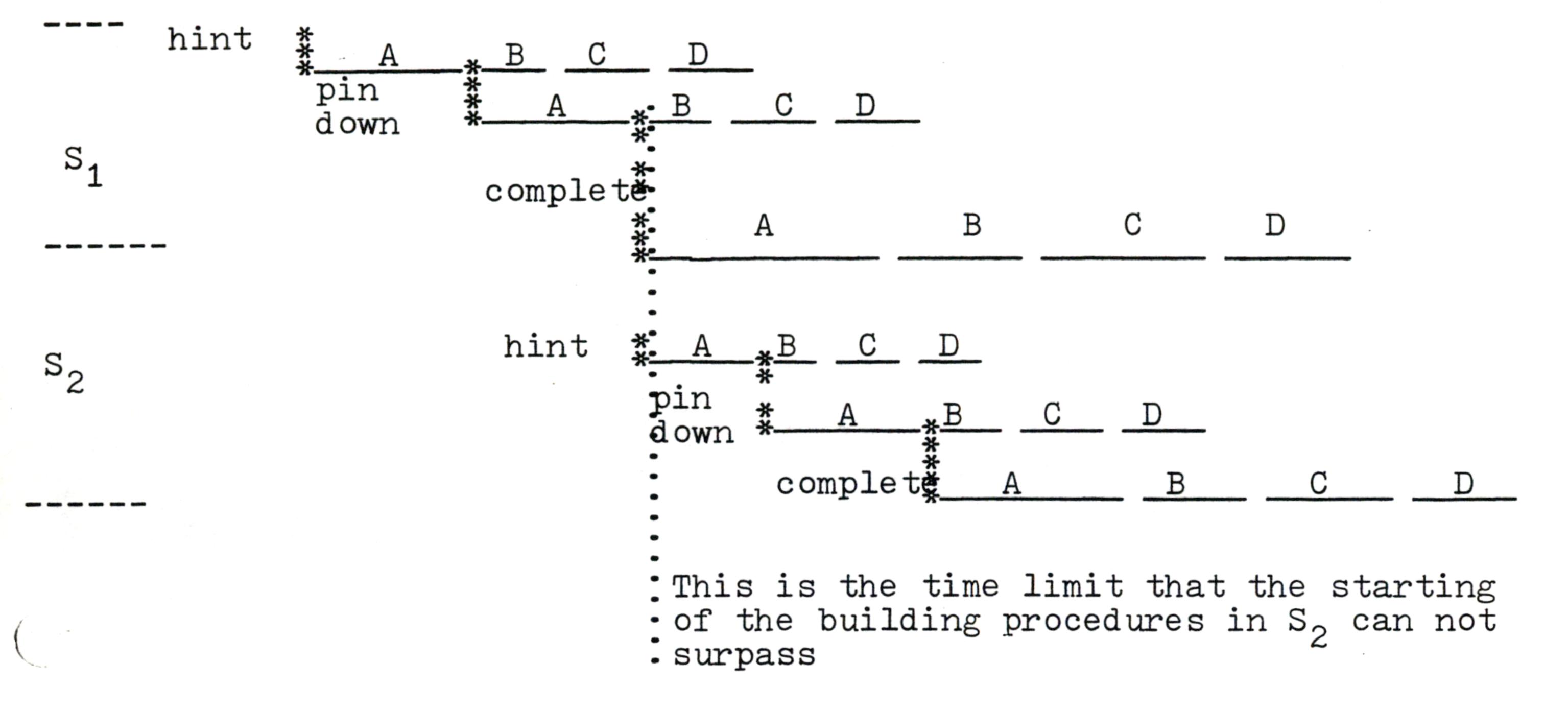
The latest for a new group of buildings to start, taking into account the time limits, will be when the building process is reaching the end of stage B; by this moment the overall form of the building is firmly established.

In yerms of the succession of the structures, XXXXX an overlapped unfolding occurs among them. When one structure arrives the phase of being pinned down, and before starts being completed, new structures will emerge.

There is a time constraint concerning the succession of one structure to another, and this is that only when the first structure ***EXEXES

reaches the phase of being pinned down by some group of buildings, and especially, only when these buildings have passed on the stage B of their building procedure, then a new structure or more, in relation to the existing ones will start.

It is like so:



The largest increment of the growth is a neighborhood. A neighborhood consists of the major structures.

Before the development of any neighborhood starts, some major and definite decisions have to be made, concerning the spatial organization of the whole area under development, like the location of the main transportation lines and infrastructure, the number of neighborhoods to be built, their approximate size and location, the character of each neighborhood and the communal facilities each neighborhood s should be provided with, as well as the public facilities that belong to the whole area and not necesseraly to any of the neighborhoods. These kind of public facilities could be handled in such a way so that the boundaries between the neighborhoods will be established.

The development of any neighborhood starts with some major agreements concerning its major structures. These structures, at this point, should be established to such a degree that the overall size, the approximate shape and the expected character of the place should be thought of and agreed upon.

The development of x x x x neighborhood can start with the establishement of more than one structure, their number depending on the size of the neighborhood, on its particuliarities, on the physical configuration of its site.

By the time the development of a neighborhood arrives the point of being half through its phase of being pinned down, then the development of a new neighborhood can start.

N stands for a neighborhood, which comprises 100-200 houses.

= - stands for that period of the development, when the neighborhood is hinted by some structures.

Length of the 8 months

P = = stands for that period of development, when the neighborhood is already well established

= = stands for that period of development, when the neighborhood is already well established by some more structures.

= = stands for that period of development, when the neighborhood is already completed.

The time taken for a neighborhood to be hinted at **XXXX* approximately 8 months. By the end of this period some structures have entered the phase of their competion and some are already hinted at.

In terms of buildings, 15-20 building should be already completed, 18-25 buildings should be half way through, and 35-40 buildings should have their foundations completed.

The time taken for a neighborhood to be pinned down is approximately 10 months. During this period, the already pinned down structures are getting completed, the hinted structures are getting pinned down and some of them **XXXX** enter their period of competion, and some new structures are hinted at.

In terms of buildings, the 18-25 building, which were half way through will be completed, the 35-40 building which had their foundation done will be almost finished, 15-20 new buildings will be totally finished, 15-20 building will be more than half way through and 25-30 buildings will have their foundations done.

Halfway through this period is the time that the development of a new neighborhood will start.

At this period already hinted structures will be pinned down and completed. Some small structures might also start.

On the XX scheme that follows a rough pattern of growth of two neighborhoods (400 houses) is shown within a period of 48 months.

For this to be achieved, 20-25 groups of workers will have to be hired. Each group XXXXXX will consist of 3 skilled workers and 5 unskilled workers and will undertake a group of houses at a time. Every two or three groups of workers will have to be in constant contact with an architect and an accountant.

