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Papers of the International Fellows  
Center for Metropolitan Planning and Research  
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Jan Boekholt, Assistant Professor, Department of Architecture and Urban Planning, Technological University, Eindhoven, The Netherlands. "The Anatomy of the Physical Planning Process."

Götz Nassuth, Head of Planning Division at the National Academy for Physical Planning in the Hague. "Problems of Contemporary Developments in Amsterdam."

\_\_\_\_\_. "General Information on National Physical Planning in the Netherlands."

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Joern Barnrock, Doctoral student candidate in the Department of Geography and Environmental Engineering, The Johns Hopkins University, from Hamburg, Germany. "Ideology, Space Economy and V. Thünen."

Francoise Chassaing, Doctoral student in Urban Sociology at the University of Lille, France. "New Town Development in France and the United States."

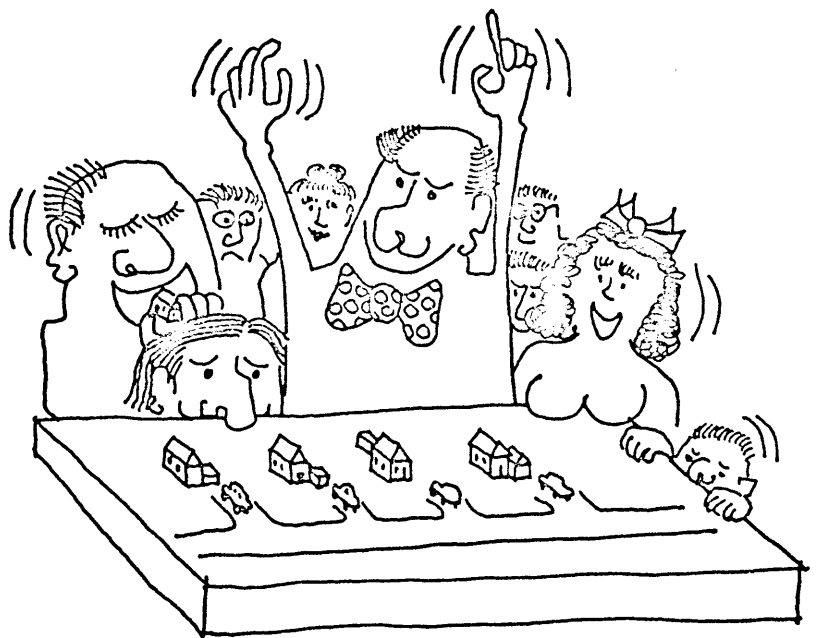
Mircea Enache, Instructor of Urban Planning at the Institute of Architecture, Bucharest, Romania. "Towards a Methodology for Comprehensive Planning in Romania."

Miodrag Ferencak, Architect-Researcher at the Yugoslav Institute for Town Planning and Housing, Belgrade, Yugoslavia. "Notes for the Introduction of an Information Variable in Models of Distribution of Retail Trade."

Vidyadhar Phatak, Assistant Planner, City and Industrial Development Corporation of Maharashtra - CIDCO, Bombay, India. "Urban Information System."

## THE ANATOMY OF THE PHYSICAL PLANNING PROCESS

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## INTRODUCTION

The achievement of a design can be the result of a purely individual process. (I make something.) In the building practice, the achievement of a design concerning the physical environment will be the result of a process concerning different human beings or groups of human beings who are involved in physical planning problems. (We will try to make something together.)

Therefore, when looking at this physical planning process, I will start from the following propositions:

1. When speaking about "physical planning," it is necessary to think in terms of a process that has to be followed in order to find a not yet existing result.
2. In general terms, we can describe this process as a "learning process" and a "group process."
3. In building practice, the quality of a physical plan will depend very much upon the interaction between the different human beings who are involved in the process, the procedures that are followed and the development of decision-making.
4. To achieve a good decision process, it will be necessary to have a clear understanding of the structure of a physical planning process. In order for you to obtain a greater understanding, I will try to give an "anatomy" of a design process. To do this, I will pay attention to the following subjects:
  - The Structure of the Design Process. What do different design processes have in common?
  - Starting Points, Norms, Standards. How can we define starting points, norms and standards?
  - Decisions, Procedures. What is the relation between the physical planning process and the decision-making process?

By going through a design process, it is very often possible to recognize different phases. Very simplified, these stages can be described as follows:

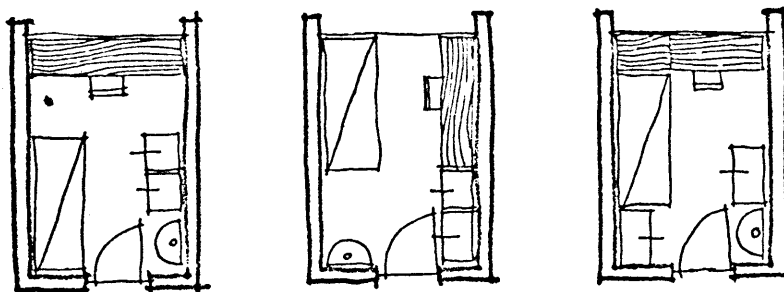
- Phase 1 - Formulation of the design problem.
- Phase 2 - Formulation of the design data.
- Phase 3 - The search for one or more solutions that will satisfy the proposed data.
- Phase 4 - The judgment of the found solution.

Lets now observe the indicated phases more carefully by looking at an example. We will choose a design problem that is defined in such a way that we do not have to discuss the formulation of this given problem (the first stage of the work).

This problem is formulated as follows: Make an interior design for a room that has to be used as a one-person bedroom.

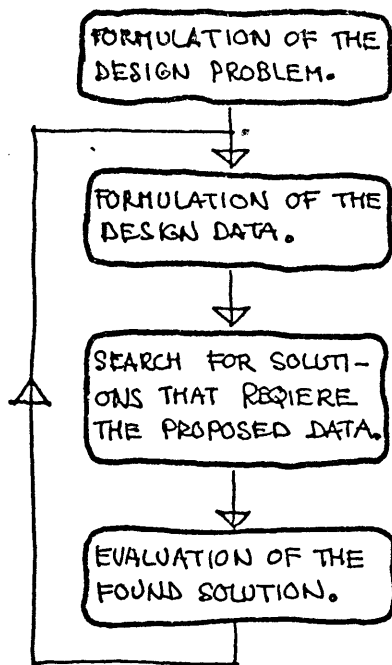
It will be quite clear that, having this formulation of our design problem, we cannot decide at once upon a suitable interior division possibility (or possibilities) for this space. To find a solution to our problem, we shall have to define further and more specific starting points. We have to define, for example, what furniture will be put into this room, the dimensions of this furniture, the amount of space needed to use this furniture and finally, where in such a room we can, or cannot, place this furniture.

As a result of the above process, we will have one or more sketches which will show the results of the work done during this stage. Most likely, several alternatives will have been found for the interior division of this room.



The next step will be to analyze these solutions. When we are satisfied with the design results, the design process has come to an end. However, there will be the possibility that we are not satisfied with the solutions found. Assuming that we did not make any logical mistakes, we will have to review our starting points and again go through the phases of the design process.

We can now draw a linear scheme, based on the description of the different phases, that will present a picture of the development of a design process.



## Phases

Looking at this over-simplified description of a design process, we will now present a definition of a phase: a phase includes a coherent number of actions that must be performed in order to achieve a continuation of a design process.

## Formulation of a Design Problem

Now we will more carefully study the different phases we indicated. Looking back at the given example (the interior design for a one-person bedroom), we must remember that the formulation of the design problem was given. And, of course, it is possible that when working together with different people on a design problem there would be no common opinion on the formulation of the design problem. It is also possible that a designer would doubt whether a sleeping room, a "sleeping cell" or a "sleeping hole" should be designed. He may want people to have the possibility of sleeping in a small niche or cell that can be part of a greater spatial environment.

However, it is clear that at a certain stage during the design process there must be an agreement upon the exact formulation of the design problem. Of course, this does not mean that during the design process the formulation cannot be reviewed. Going through the different phases of a design process (formulation of starting points, search for a solution, the judgment of the solution) it is often impossible to find a satisfactory solution for the given problem since the starting points are always an estimation of the existing situation. As can be seen, the formulation of the design problem is an important and often not a simple step. A good analysis of an existing situation will, therefore, always be necessary.

## Formulation of the Design Data

In order to complete phase 2, we have to formulate a number of data that will lead us to clear decisions about the position and dimensions of spaces and materials. However, when we consider the physical planning process as mostly being a process in which many different individuals and groups of people are involved, we will have to set data which must be accepted by everyone who participates in this problem-solving situation. Therefore, once data has been commonly agreed upon, it will be referred to as "norms" or "standards."

## Norms and Standards

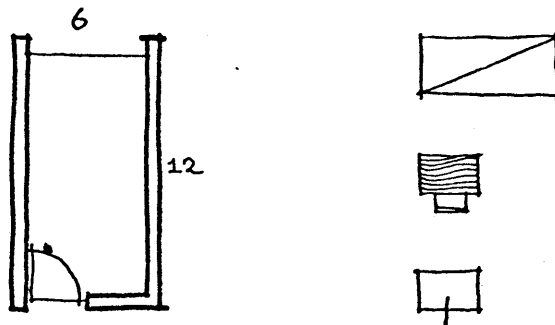
Within the framework of the total number of standards we have to formulate, it is possible to make a distinction between different groups of data. Dealing with physical planning problems, we will always have to deal with a "situation" and with the "elements" we have to place into this existing situation. So, we will make a distinction between:

1. Standards related to the situation.
2. Standards related to the elements.
3. Standards related to the position of the elements in the chosen situation (position rules).

We now will illustrate this by looking at the example we used before, the interior division of a one-person bedroom.

## Situation

First, let's assume our situation is a 6 x 12 foot room with a facade on one side and the door in the opposite wall of this room.



## Elements

Secondly, we must choose some elements we want to put into this room, such as the kind of furniture and the number of different pieces of furniture needed to use this room as a one-person bedroom. For instance, we could choose 1 bed, 1 desk + 1 chair, and 1 cupboard (closet, chest of drawers).

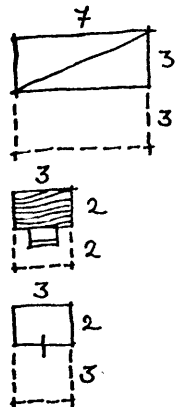
## Position Space User's Space

Thirdly, we have to decide upon the dimensions of the furniture and also upon the dimensions of the space in which we need to use it. For instance, we must know the exact dimensions because the user is still anonymous to us. This will

be the case, for instance, when dealing with the design of a mass housing project. Therefore, we will have to set standards which will be called the "position space" and the "user's space." Position space is defined as the space reserved to insure that a piece of furniture can always be placed. User's space will be defined as the space we have to reserve to be sure a certain piece of furniture can always be used.

These data are, of course, very elementary. We will need these data so often that we do not want to review them again and again. Therefore, we will try to standardize these dimensions. Returning to our example, we will give the generally accepted standards for public housing.

	position space	user's space
bed	3 x 7 feet	3 x 7 feet
cupboards	2 x 2	2 x 3
	2 x 3	3 x 3
desk and chair	2 x 3	2 x 3

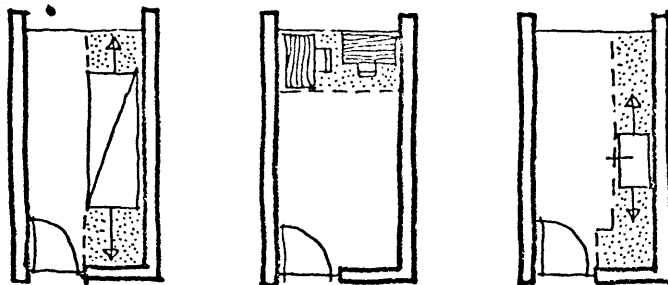


#### Position Rules

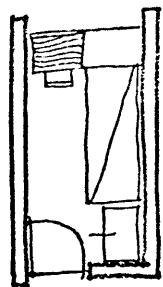
The last thing we have to do is set standards for the position of the furniture in the chosen room. Compared to the dimension standards, these position standards will not be so generally accepted; however, very often we will consider these standards to be self-evident. It will be much easier to define these position standards through illustration rather than to give a verbal description.

Therefore, we will illustrate:

1. The position standards for a bed (with the longest side against a side or rear wall of the room).
2. The position standards for a cupboard (against the side or rear wall of the room).
3. The position standards for a desk and chair (near the window, parallel or square to the facade).



In these drawings, areas (or zones) in which the different pieces of furniture could be placed are indicated.



Having defined the design data, we can now find a number of interior division possibilities for the chosen room. When drawing the different alternatives, we will use a 1 foot modular grid and relate the position of the different pieces of furniture to this modular grid. For example, when illustrating the different positions for a bed, we will move this bed at least  $n \times 1$  ( $n = 1, 2, 3$ ) for each new position.

As a result, we are now able to present different interior division possibilities that will meet our defined standards.

However, it must be clear that in practice, it is always possible to start with a different set of data. The given set represents just one example of a great variety of possibilities.

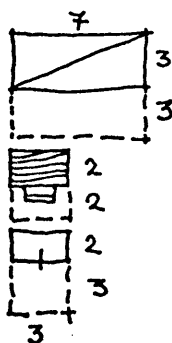
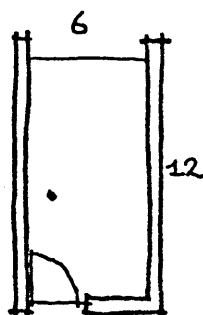
Looking at our example, we now can reach the conclusion that whenever we want to solve a physical planning (design) problem, we must have the following sets of standards:

1. Standards related to the "situation."
2. Standards related to the "elements."
3. Standards indicating the position of the "elements" within the "situation."

Using the example we dealt with, we could very easily indicate the situation and the elements.

situation - the given room

elements - the position space and user's space of the chosen furniture.



However, when our problem is the design of a floor plan (or different floor plans) of a housing unit, we can give the following classification:

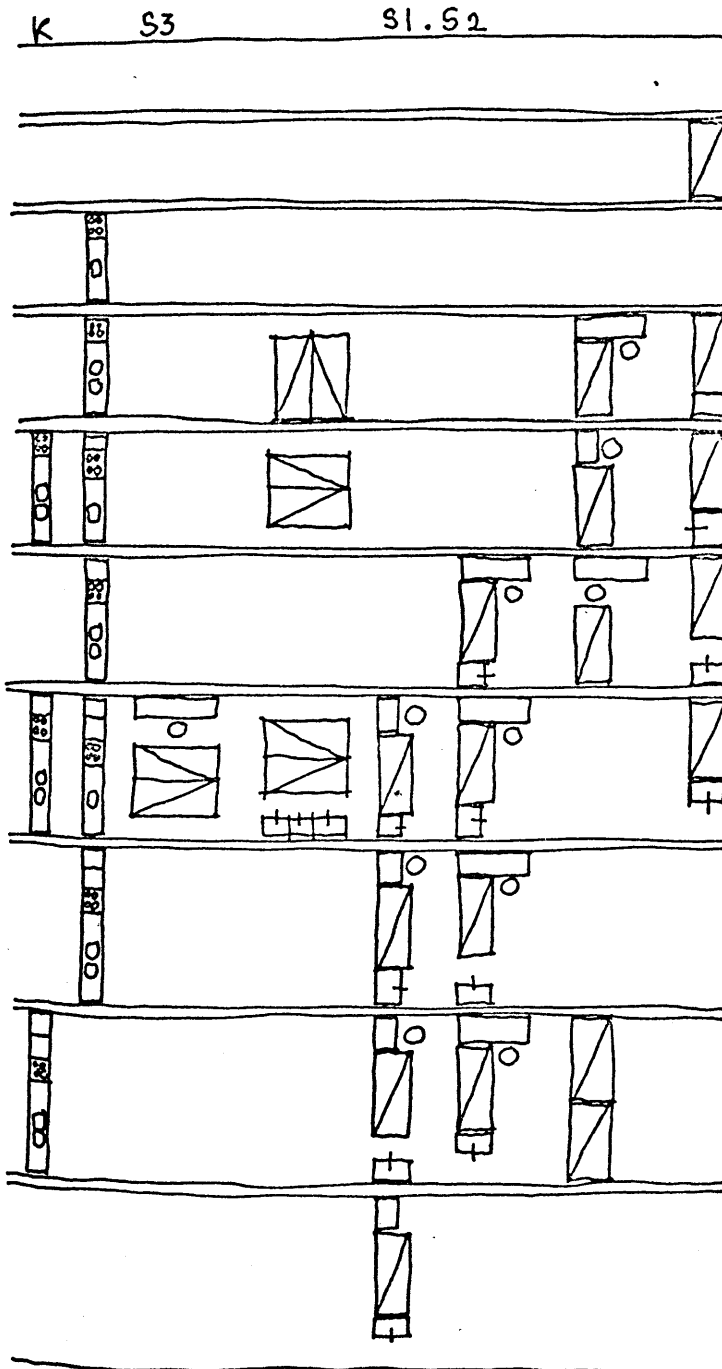
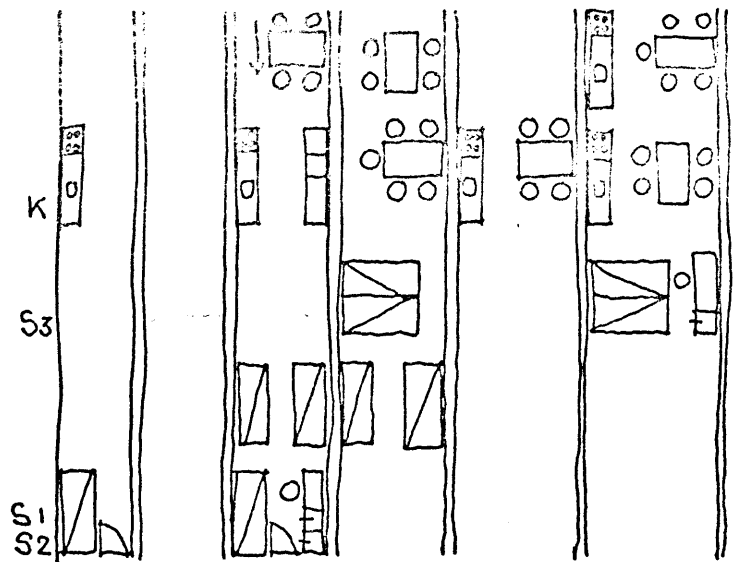
situation - a certain space bordered by a chosen structure..

elements - dimensions of rooms reserved for the different functions, such as sleeping, cooking, eating, sitting, etc.



To set standards for good dimensions for these kinds of rooms, each with a different function, a survey of widths and depths of so called "specific living rooms" is presented here.

By drawing the positions of necessary furniture, the use-value of different dimensions can be indicated.



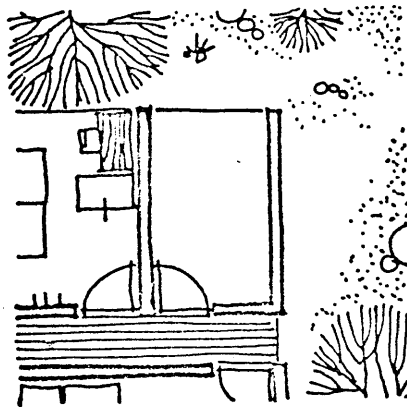
	6	7	8	9	10	11	ETC.
6	36	42	48	54	60	66	
7	42	49	56	63	70	77	
8	48	56	64	72	80	88	
9	54	63	72	81	90	99	
10	60	70	80	90	100	110	
11	66	77	88	99	110	121	
12	72	84	96	108	120	132	
13	78	91	104	117	130	143	
14	84	98	112	126	140	154	
15	90	105	120	135	150	165	

Designing a plan for a residential area, the situation then becomes a certain area, usually part of an earlier derived allocation plan. The elements can be housing units, streets, squares, parking areas, etc.



## The Situation

The situation always will have a physical character. To indicate what the situation is, we can present a drawing. However, by simply looking at a situation, it is very often possible to recognize an area in which we are able to place our new elements; and a certain area that we consider to belong to the situation but in which we cannot place our elements.

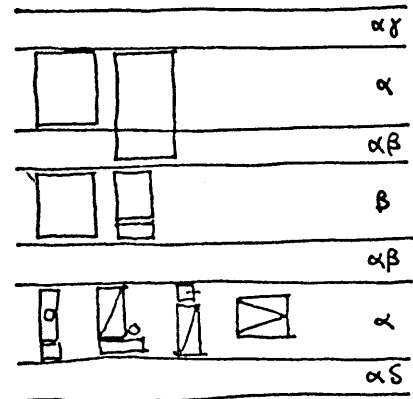
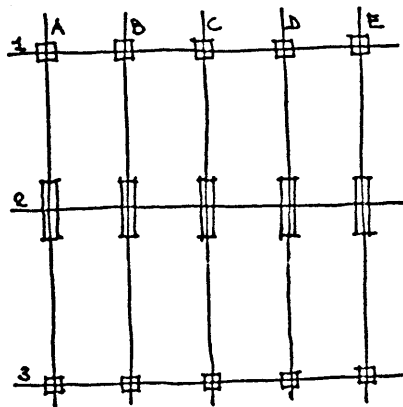


Let's again observe our example of the interior division of a bedroom. The position of the furniture will not only be influenced by what is happening inside this room but also by its relation to the exterior. The position of the sun, the position and dimension of trees, houses which we can see outside our window, etc., can influence the position of, for instance, the desk or bed. Consequently, the total situation takes into consideration more than just the room itself. We will define the direct situation as the area in which we can place our elements. We will define the "situation" as the physical environment that includes everything that will determine the position of the new elements we want to bring into the chosen area.

A situation represents a kind of physical background for a complicated system involving social relationships. Changes in the physical situation can influence this system in one way or another. Therefore, it will always be necessary to give an analysis of this system before we introduce new elements into a chosen situation (system analysis).

Sometimes, when dealing with a design problem, we want to study the relation between different elements. In this case, we do not yet have a specific physical situation. Therefore, we will have to choose a more general situation which will enable us to define the position of our elements.

We can, for instance, use a grid system and relate the position of our elements to the lines of this grid. The grid systems we will use to coordinate the position of the partition walls or structural material, such as walls or columns, are well known.



We also might relate the position and dimension of rooms or houses, for example, to zones indicated by the grid lines.

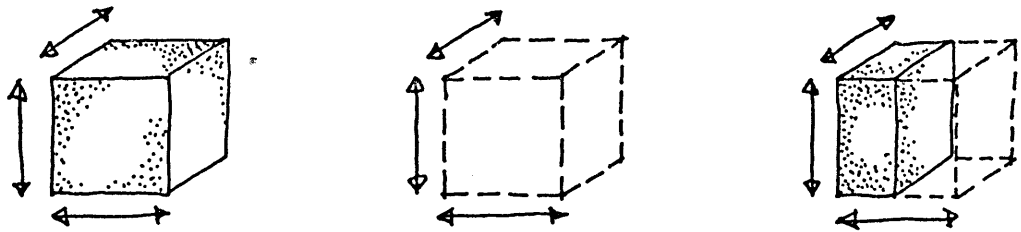
In general, we can state that we will either relate the elements to a line of the grid system (with the heart line of the element on a grid line) or to an area indicated by two or more grid lines (in which the element will be positioned between two or more grid lines).

A physical situation can be seen as the décor for the play we call living. Sometimes we take away or add something to this scenery and nothing will result. Sometimes we remove the castle and the role of the prince will become a ridiculous one; sometimes we add a highway and the people living next to it will become nervous and ill.

## Elements

Consequently, yet another choice we must make when determining our design data is the choice of new elements we want to bring into our situation. Depending upon the nature of a design problem, an element can either be an object (a cupboard, a wall) or a certain space (a room, a square). Very often, an element

can also be an addition of both material and space. For instance, the dimension of an element may be comprised of the dimensions of a certain piece of furniture and the user's space belonging to this equipment.



If we have to choose an element, we must define exactly the following data:

1. The kind of element
2. The dimensions of the element
3. The number of elements

Sometimes we also have to define, when the element is an object, the color and texture of the material; however, especially during the first stages of a design process, we usually deal only with the dimensions of a chosen element. When it is indicated that the dimensions of an element have to be defined, this does not mean that we have to know the precise dimensions of the element. During a certain phase of a design process, it will be possible to use an element, knowing for instance only the minimum and/or maximum dimensions of it.

## Position Rules

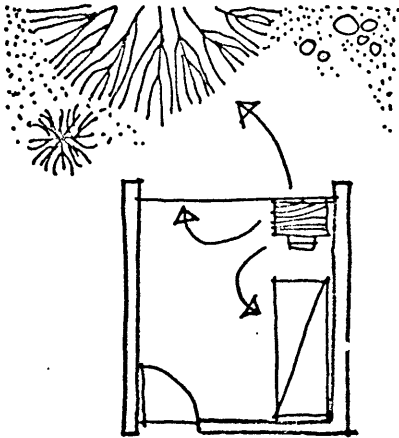
We already indicated that when solving a design problem, we also have to define the position (or possible positions) of the elements inside the situation. Therefore, we have to formulate position rules which are determined by the following:

1. The relation between different elements
2. The relation between the different elements and the situation

Defining the position of the elements will very often be one of the most difficult steps. To explain this, let's return to our already familiar example for one more moment. The position of a desk in our bedroom will be influenced by our perception of the following relations:

1. The relation between the desk and the bed. By making a drawing, we indicate which positions of the desk and bed we will (or will not) accept.

2. The relation between the desk and the room.  
We would not, for instance, place the desk before the door but would place it somewhere near the window.
3. The relation between the desk and what is happening outside our room; our view out of the window, the way the sun comes in, etc.

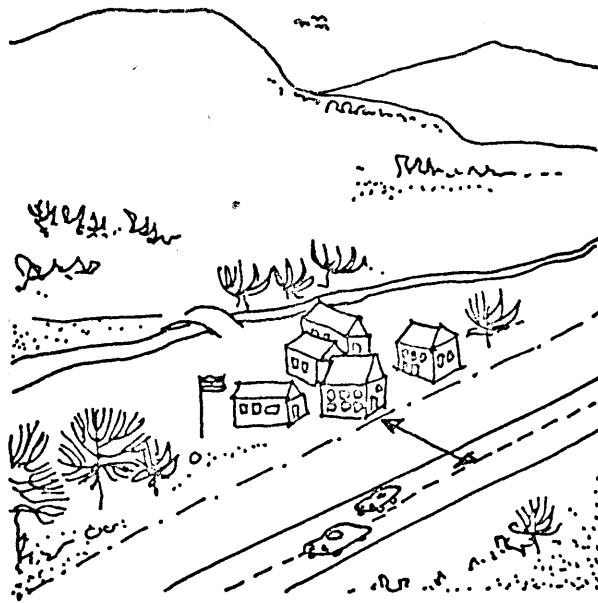


**Relations**

A relation is something that will always be perceived differently by individuals or groups of human beings. In general terms, it is very often difficult to define certain relations. However, when dealing with the solution of a design problem, we are forced to define exactly the type of relations we think are relevant. We can, for example, observe all kinds of relations such as social relations, functional relations, color relations, spatial relations, etc. The study of the perception of relations is one of the most difficult and also one of the most interesting things to do. However, when we want to solve a design problem, we must always be aware of the fact that the result of this research has to be defining standards for positions and dimensions of space and materials.

**Situational Elements**

Let's now return for a moment to standards related to physical situations and elements. Very often, we will find that when confronted with a certain situation, we will immediately recognize several situational elements. For example, if the situation for a residential development is a certain area of land, we will recognize different situational elements such as trees, a river, already existing dwellings or farmhouses, etc. One of the most important things we have to do is to give a description of the user's value of the different objects and areas we will recognize. We may not wish to have all of the trees cut down or we may designate a certain sunny place as a meeting point, etc. Mostly, we will describe the user's value by saying that "a certain element can (or cannot) be placed in a certain area."

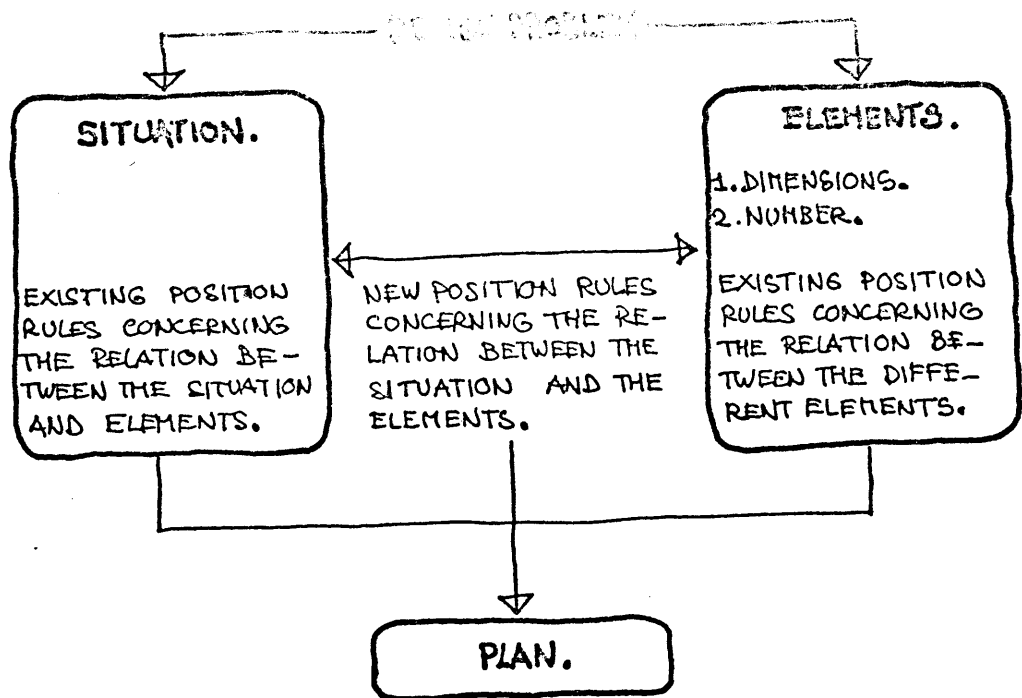


## Legal Situation

Very often there already will be some existing "legalized" regulations related to the position of elements in the situation, such as a city regulation which might require a house to be placed at least 300 feet from the middle of the road. In this case, we can state that we have to deal with some kind of "legal situation." In practice, it will very often be difficult to have a good review of all the legal regulations that are connected to a chosen physical situation.

When defining our elements, we will find that many other rules or regulations will come into play in addition to the "legal situation." Rules may specify that certain elements, for example cupboards, can be put together only in a specific way. Other position rules may relate to the general physical situation. Let's say, for example, that our problem is the interior division of a housing unit to be achieved through the means of a set of partition walls. In this case, it is possible that even when we do not have the exact drawing of the housing unit (the situation) we can deal with position rules for the partition walls, which are related to a modular grid system. This grid system will present a more general physical situation. A position rule could then be formulated as follows: a partition wall will always be placed with the heart-line of the wall upon a line of this modular grid system.

Let's now present a general scheme showing which design data we have to define to be sure we can reach a solution to design problems.



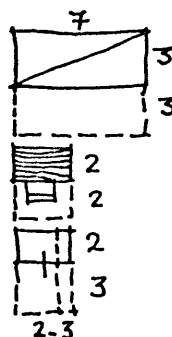
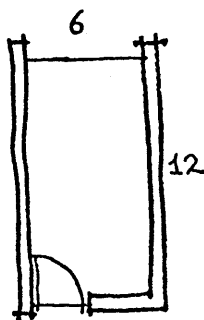
## Processing The Data

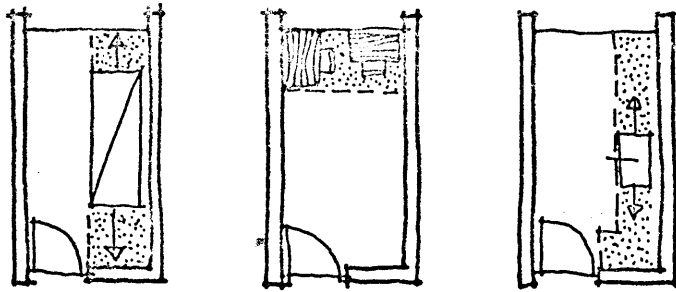
Having defined exactly all our data, we can now proceed to a final solution. Usually, this means we will present a drawing or a plan. To begin with, the method we will use to find our design result has to meet the following requirement: it must be systematical and it must lead us to all the different alternatives that will satisfy our already defined data. It will not always be necessary to present all the alternatives; sometimes we will be satisfied with our first solution. But to gain some insight into the development of a design process, we here will pay attention to a methodology that will help us to find all possible alternatives.

A technique we can use to find all possible alternatives includes the drawing of a so called "tree structure." Again, we will use our already familiar bedroom to illustrate how to draw a tree structure. First, we will review our data:

Situation: a 6 x 12 foot room

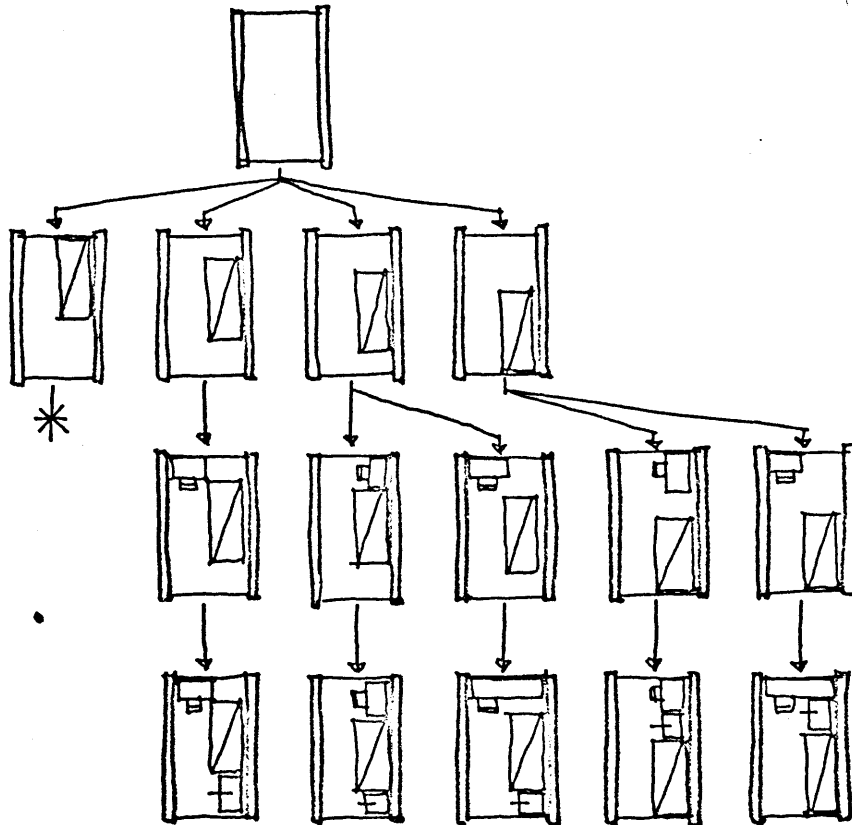
Elements:	number	kind	pos. space	user's space	position
	1	bed	3 x 7	3 x 7	alongside wall
	1	desk	2 x 3	2 x 3	near facade
	2	cupboards	2 x 2	2 x 3	alongside wall
			2 x 3	2 x 3	





## Tree Structures

Now we are able to construct our tree structure. The first step is to draw all the possible positions of, for instance, the bed within the given situation. Secondly, for every position of the bed, we can now draw the possible positions for a desk. And finally, for every position of the bed and desk, we have to draw all the possible positions for cupboards. According to our defined standards, five alternatives for the interior division of this 6 x 12 foot bedroom are now available.



If we were dealing with a more difficult problem, the construction of a tree structure would be a very complicated step. This example is only used to show one of several methods available which can help define all the possible alternatives in a systematical and logical way.



## Evaluation

Another phase of the physical planning process which can be distinguished is the "evaluation phase." During this phase, we will try to observe and to judge our estimated design result. One of the following steps can be taken:

1. We can determine if the plan requires the earlier formulated data.
2. We can compare the new plan with an already existing development.
3. We can compare our new plan with an expected result.

Testing our plan to see if it requires the defined data is something that can easily be done. It consists of simply controlling the method we used to ensure that errors were not made while processing the data. Since we used a tree structure to find our solutions, going through this process was much easier than in actual practice where solving a design problem is a much more complicated step and most often standards are not formulated as explicitly as they were here.

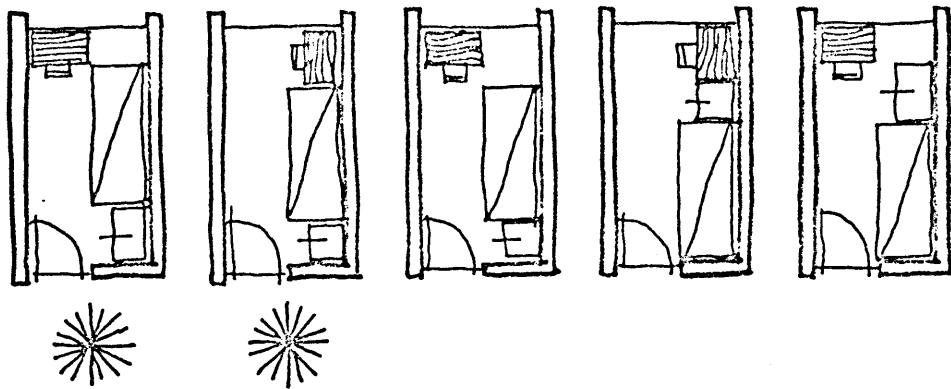
We can also compare our plan with an existing or expected result. When designing, for instance, a new engine, we are able to measure the amount of horsepower and we can compare this with the amount of horsepower of existing engines. Also, it is possible that we might have developed a theoretical model that would raise some expectations about the amount of horsepower of our new engine; and, of course, we can compare this calculated result with the measurements showing the power of our newly developed engine. Using this example, we compared some technical data. However, when dealing with physical planning problems, it will be necessary to not only give a technical evaluation of, for instance, the structure of a designed building but also to evaluate the way people can use the different spaces this building offers. It will, for example, be important to measure the functional and perceptual aspects of the newly developed plan.

When comparing our plan with some existing or expected results, we will have to make a judgment in terms of whether this plan offers something better (stronger, more beautiful, etc.). This judgment is obviously an assessment of values. Our plan will have a certain value (or quality). Assuming that no errors were made in processing the data, the quality of our result will depend, of course, directly upon the defined data.

Once we have evaluated our new plan, we will have determined whether:

1. We are completely satisfied with the reached solutions.
2. We will choose one or more solutions out of the total number of alternatives and accept these alternatives as the best one.
3. We are not satisfied with our results and need to review our earlier defined data to develop a new plan.

Selecting one or more alternatives essentially means a review of the starting points. In this case, we added to our existing data a number of more specific requirements that restricted our total number of alternatives. Let's observe, for instance, the five previously illustrated interior division possibilities for a one-person bedroom derived through the tree structure. Evaluating these alternatives, we can state that we are only satisfied with the first and second solutions.



This will mean that we added to our original set of data the following requirements:

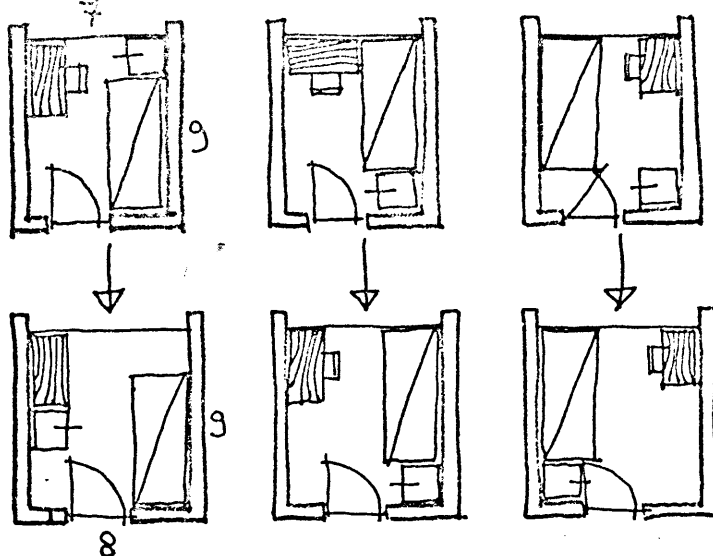
1. When we have useless space behind the desk, we prefer to have a 2 x 3 foot cupboard. (We always prefer solution 1 to solution 3.)
2. Cupboards must be positioned in the back of the room.

This means that there is a restriction upon the dimension of the element (cupboard) and also the formulation of a new position rule.

If, during the evaluation phase, we reach the conclusion that we are not satisfied with the developed plan, we have to review our earlier defined data. This means that we can:

1. Choose another situation.
2. Choose other elements.
3. Formulate different position rules.

We will illustrate this by using another example. Let's assume that we want to draw three different interior division possibilities for a 7 x 9 foot bedroom. Inside this bedroom, we want to put 1 bed, 3 x 7 feet, 1 cupboard, 2 x 2 feet, and a desk, 2 x 3 feet. When processing this data, three different alternatives can be found; but we will probably reach the conclusion that none of these alternatives will satisfy our expectations of a good bedroom for one person. Either the user's space will be too small, the door cannot be opened or we cannot reach the bed or the desk.



Consequently, different possibilities need to be sought. In this case, the most satisfying solution would be to enlarge the chosen room (the situation) to, for example, 8 x 9 feet. However, a second possibility would be to choose different or smaller elements. We could perhaps be satisfied with a 1 x 4 foot cupboard or a 3 x 6 foot bed. By formulating different position rules, we will, in this case, still not reach the most satisfactory solution; however, in principle, this will be another possibility.

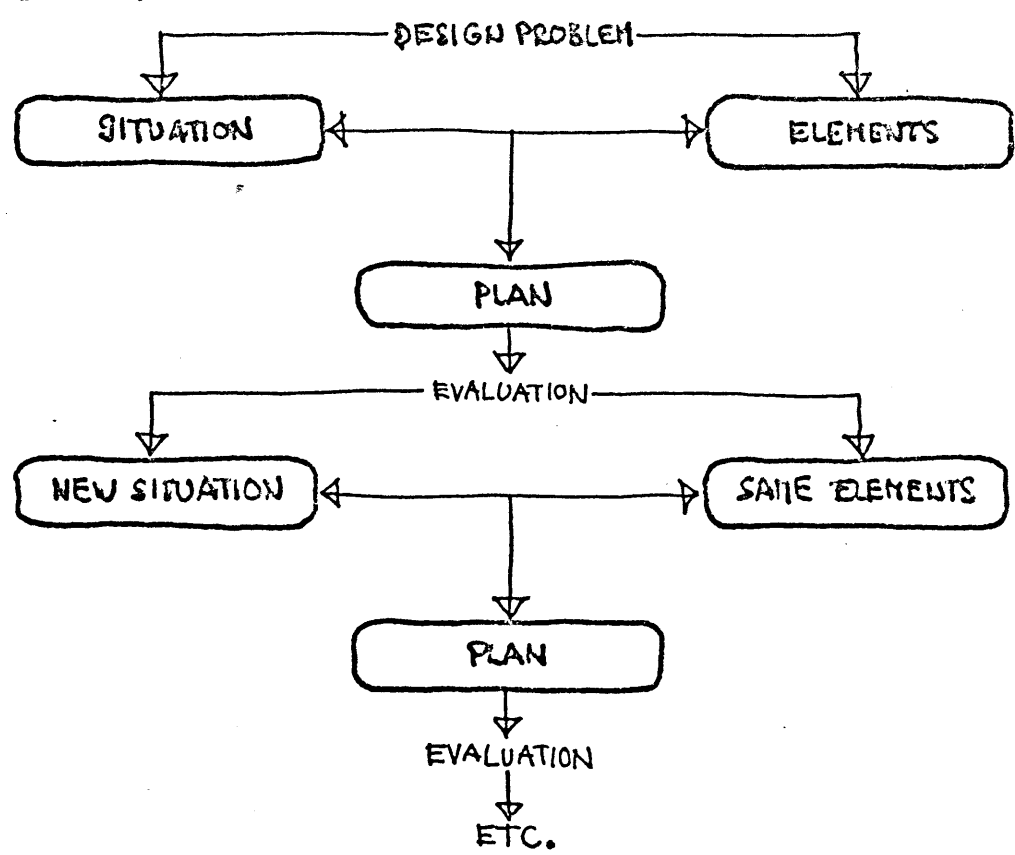
Looking back at all the examples used, it can be noted that we were always provided with a given situation. However, a design problem can be formulated in such a way that we do not have a physical situation. This will occur, for instance, when we would have to determine the dimensions for a one-person bedroom which would be most pleasing to us. When solving this particular design problem, we will start by choosing the different elements we want to put inside this ideal room (1 bed, 2 cupboards, a large desk, a chair, etc.). Having defined exactly the position and user's space, it is now possible to choose the dimensions for this room. However, there is only a small chance that we would be able to find the most satisfactory dimensions for this room at first. For example, we can take the following steps:

1. Define our program (choose the elements).
2. Choose dimensions for a room that we think will require our standards.
3. Formulate all necessary position rules.
4. Find a solution.
5. Evaluate this solution.

Since a satisfying solution was most likely not yet found, we would proceed as follows:

6. Choose other dimensions for the room.
7. Again, place our furniture in this room and evaluate the alternatives, etc. etc.

This process would be repeated until a satisfying solution is reached.



Observing this process, we will notice that even if a situation is not given, we can only reach a solution to a design problem once we have chosen a new physical situation.

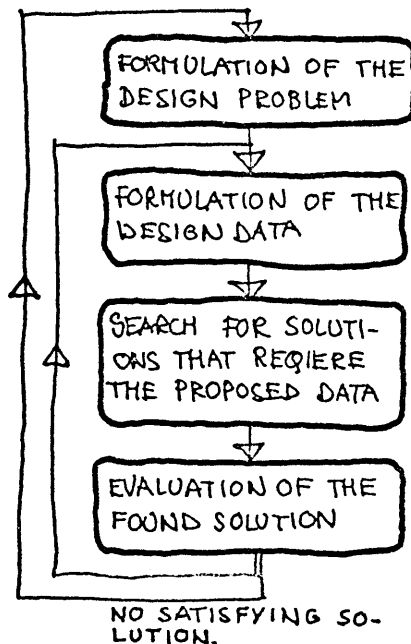
The Formulation  
of Design  
Problems

Now, we can present a schematical review of the different ways a design problem can be formulated in terms of given or not given data. To do this, the following code will be used:  
S = situation. E = elements. P = position rules.

Given	Needed
S.E.P.	alternatives
S.E.	P alternatives
S.	E.P. alternatives
E.	S.P. alternatives
X.	S.E.P. alternatives

It is assumed that we can only formulate the position rules once we have studied the relation between the situation and elements. In practice, however, we will usually not have to deal with such a rigid scheme as is presented. Very often, we will know something about the situation, perhaps some or all elements or some of the position rules will be quite obvious. In general terms, we can state that the more data which is available, the easier it will be to find a solution to a design problem.

Until now, we have assumed that we will always find a satisfactory solution to our design problem. However, it is possible that we would not be able to reach a suitable solution. This, of course, will mean that we simply have to accept that there is no suitable solution or that we have to again review the problem. In the latter case, we will have to eliminate or modify some of the limitations we accepted when we started the design process. Later on, we will pay more attention to this.



## Levels of Physical Planning

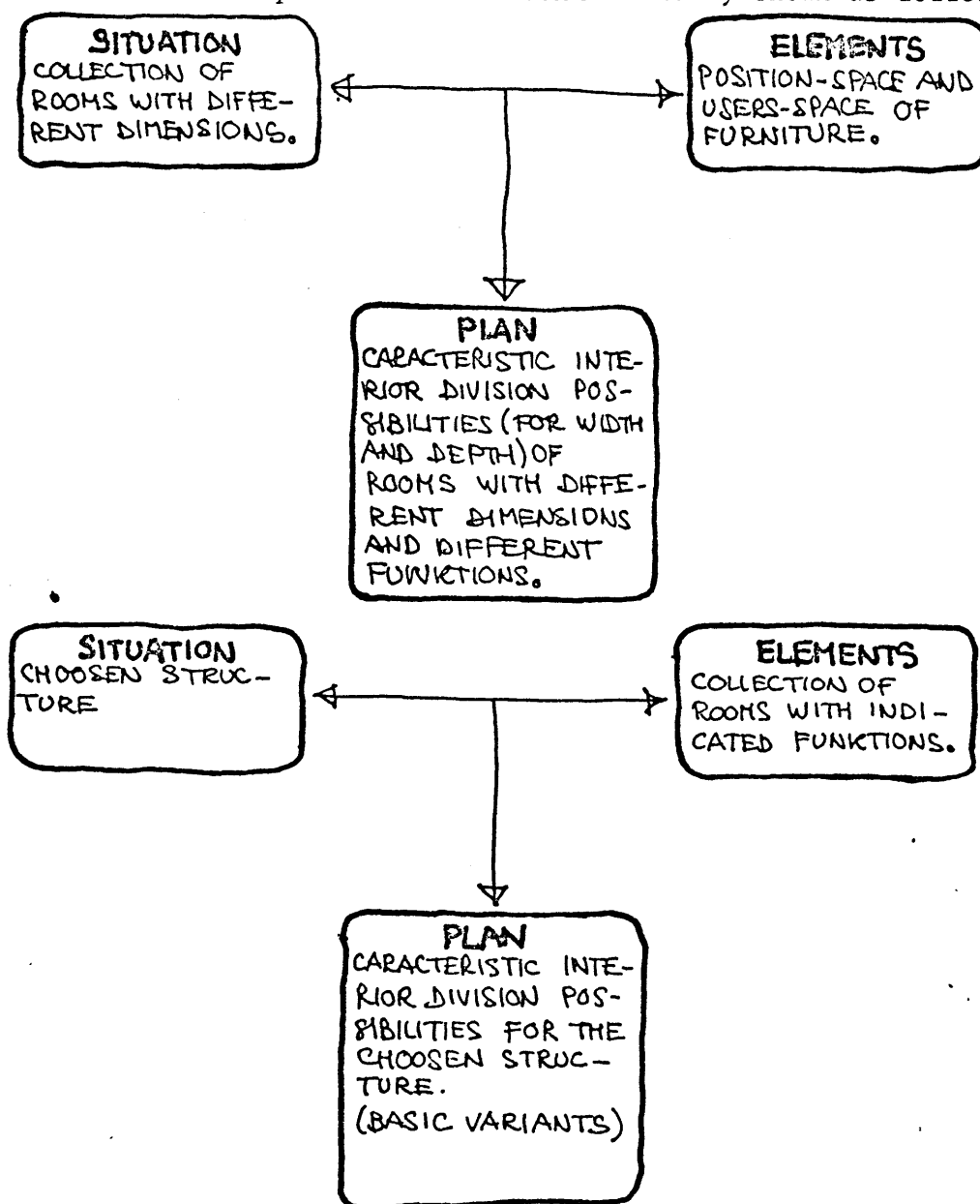
We have previously observed only very simple physical planning problems. Normally, we will be confronted with much more complicated problems which include the designing of an element, such as a chair, or even a complete new town. In order to obtain additional insight into the complexity of a physical planning process, we will now introduce the term "level of physical planning."

In order to describe a "level of physical planning" we will now study the following examples of a design process. Let's assume an architect wishes to design a complete house. He can begin the process with a rough sketch illustrating the organization of the different rooms. Another possibility is to start with a study of the dimensions of different living rooms or even with a formulation of the number of pieces and the dimensions of the furniture. Depending upon his knowledge and experience, he can attack this problem in a number of ways. However, when starting with a rough sketch of the organization of different rooms, he will be eventually forced to define the exact dimensions of the rooms; and to do this, he must also define exactly the different design data related to the chosen furniture.

One possible scheme which can be utilized to find a satisfying solution is as follows:

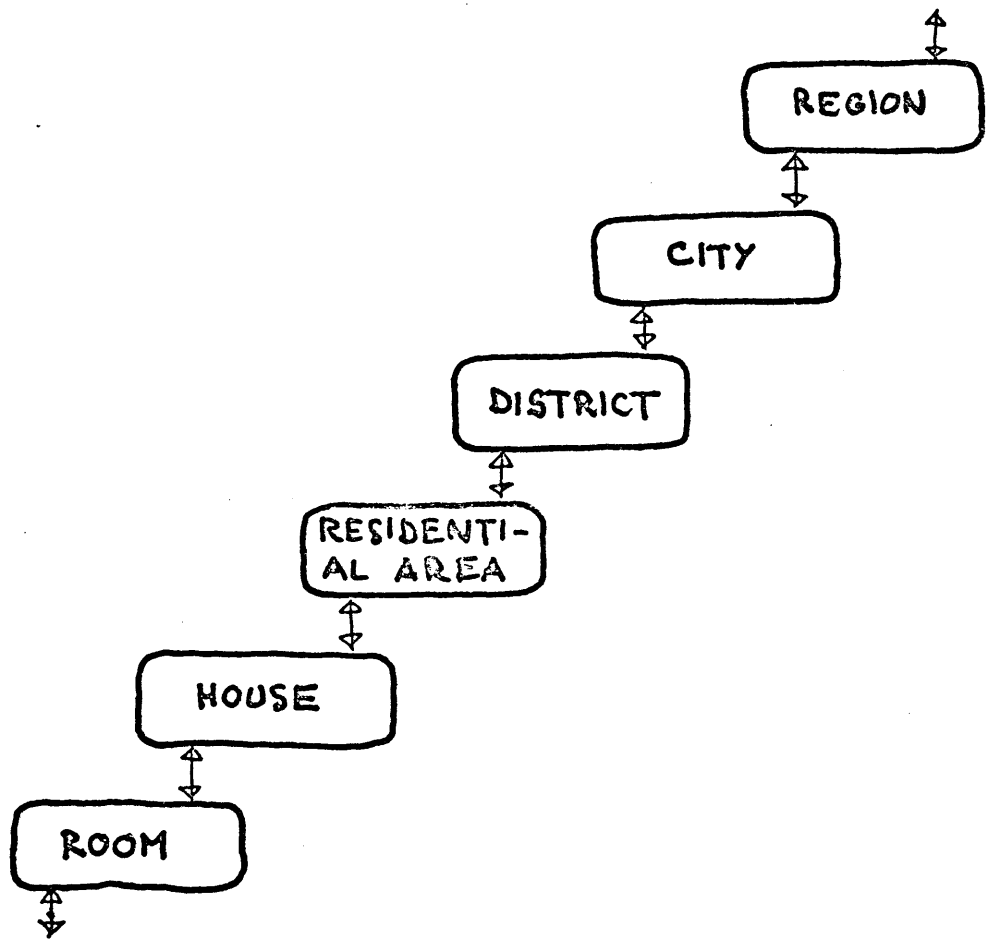
- Goal: The design of a dwelling.
- Study 1: Definition of the position space and user's space of the chosen furniture.
- Study 2: Definition of the interior division possibilities of the rooms. Definition of suitable dimensions for different rooms.
- Study 3: Definition of the relation between different rooms (with different functions).
- Study 4: Definition of the exact position of the rooms in relation to each other.
- Result: A new dwelling.

By observing this schematic outline, we will notice that we can describe this process by using the data classification already presented. We will observe that the designer has to choose a number of different situations and elements; position rules must be formulated through the study of relations; and the data must be processed. The alternatives must be evaluated and the final solution, satisfying to the architect, must be obtained. This process can be schematically shown as follows:



We can now indicate that the designer worked on two different levels of physical planning. These levels will be defined by the choice of the situation and the elements. However, the level of physical planning will be indicated by describing the direct situation.

By observing the work of physical planners, a number of successive levels of physical planning can be seen:



Through the introduction of these levels, additional insight into the structure of a physical planning process can be gained. Questions such as-What do different processes have in common? - How does a designer structure his decisions? - need to be asked. Since every scheme usually presents an oversimplified image of reality, it will be necessary to explain this schematical outline in more detail.

First, a more general definition of a level of physical planning must be presented. When referring to research done on the level of a "room," we intend to do more than study "rooms." A room will simply indicate a certain level of research. For instance, it would be possible, when working at this level, to study the design of a sleeping nitch or a sitting area instead of a sleeping or a living room.

Secondly, it must be very clear that a level of planning very often does not "exist" but instead has to be "defined" by those involved in the physical planning and decision-making process.

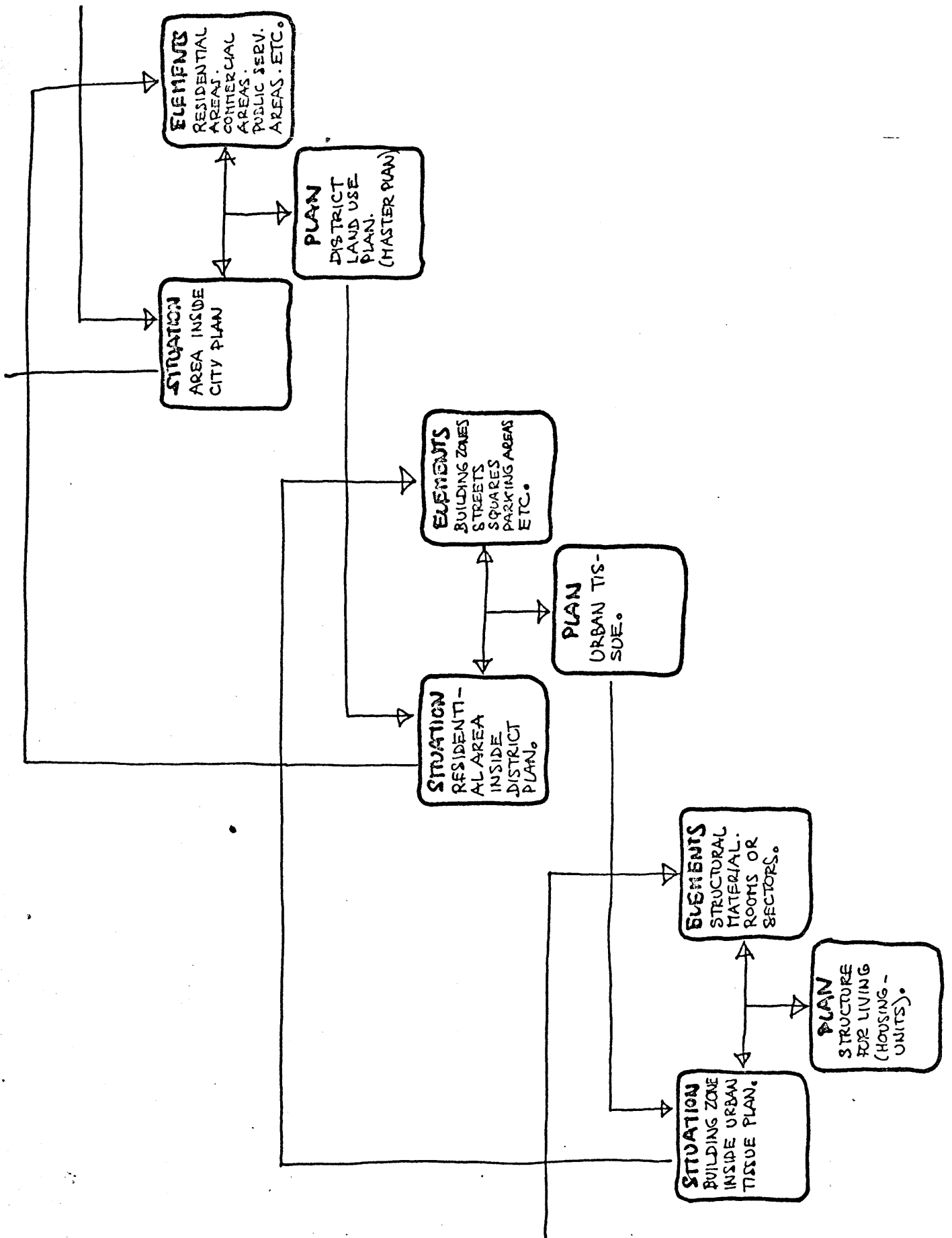
Thirdly, we do not want to give the impression of the design process being a strictly linear process. On the contrary: when a physical planner wants to achieve a good design, he has to go through the different levels again and again. (From the small to the large scale and vice versa.)

#### Relations Between Levels of Physical Planning

The relations which exist between different levels of physical planning can best be described through illustration. Therefore, let's again observe a scheme presenting different levels of physical planning. When introducing elements in a situation, the user's value of the chosen situation is being indicated. Once having approved a situation, we now are able to use this situation as an element on a higher level.

For instance, a building zone can present a situation for the design of a structure for living or a number of housing units. However, this building zone can also be used as an element on a higher level. Together with streets, squares, parking areas, etc., it can be chosen as an element to develop, for example, an urban tissue plan or model.





Conversely, we will see that an element on one level can represent a situation at a lower level. For instance, a residential area may represent an element at the level of a district but may also serve as a situation in the development of a house.

Of course, the above illustrated schemes are oversimplified mainly because we are just sketching collections of elements rather than specifying each separate element. Later, we will try to describe and define in more detail the different levels of physical planning.

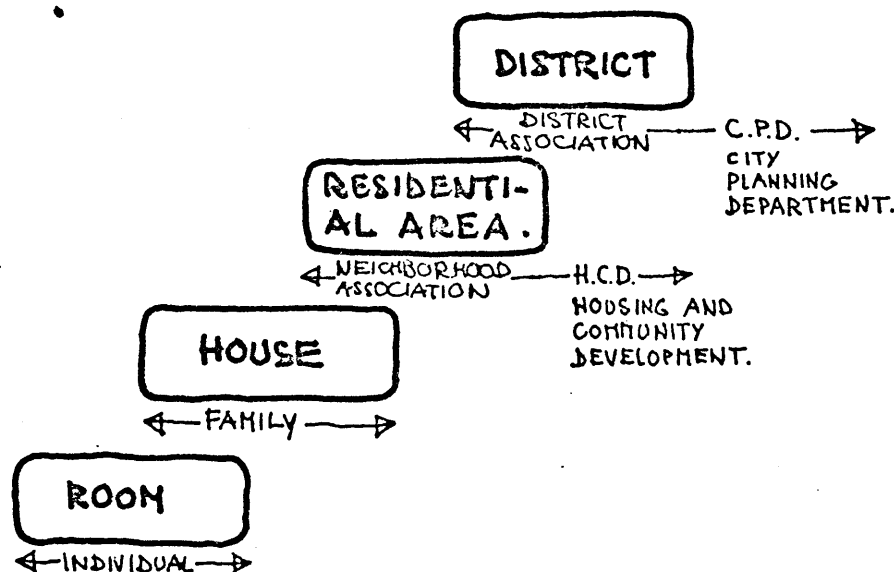
## Decision Levels

As previously mentioned, a physical planning process is defined as a process in which a number of individuals or groups of human beings are involved. During this process, a number of people must decide either simultaneously or successively on many different things.

Designing only one simple housing unit, we have to deal with the future dweller, the architect, the municipality and the contractor. Achieving a master or comprehensive plan today involves even more people, including committees, action groups, advocacy planners, etc. Groups such as these have very different interests and motivations for participating in the planning process and it is quite obvious that the final result of a physical planning process will be strongly influenced by the way in which these people are able to coordinate their efforts.

To achieve a well-structured design, it will be very important to define exactly "who decides upon what." In relation to physical planning, we now can define a decision level by indicating exactly which people or groups of people decide upon standards related to different situations and elements.

It will, for instance, be possible to indicate in our schematical review of a physical planning process different decision levels.



General  
Observations

We have already given an anatomy of the physical planning process by describing some aspects different planning processes have in common. We indicated that whenever we want to reach a satisfying result, we have to pay attention to the following:

1. The structural aspects of a design process.
2. The starting points
3. The interaction between the different persons involved in the process and the way decision-making is related to the physical planning process.

To describe this process, we indicated different phases and levels of physical planning. In practice, it will be very difficult to define precisely when one phase ends and the next begins. Also, it will be difficult to indicate the boundaries between the different levels of physical planning. However, when we want to achieve a better decision-making process, we need to have a clear insight into the structure of the physical planning process, not only to be able to structure a design process beforehand, but also to evaluate ongoing processes.

Nonmaterial  
Material

At this point, we would like to present some observations which are not related to specific aspects of physical planning but rather relate to the entire process. In the physical planning process, one can proceed from a non-material (non-physical) statement to a material result. This means a drawing and/or a report will be presented indicating positions and dimensions of spaces and materials.

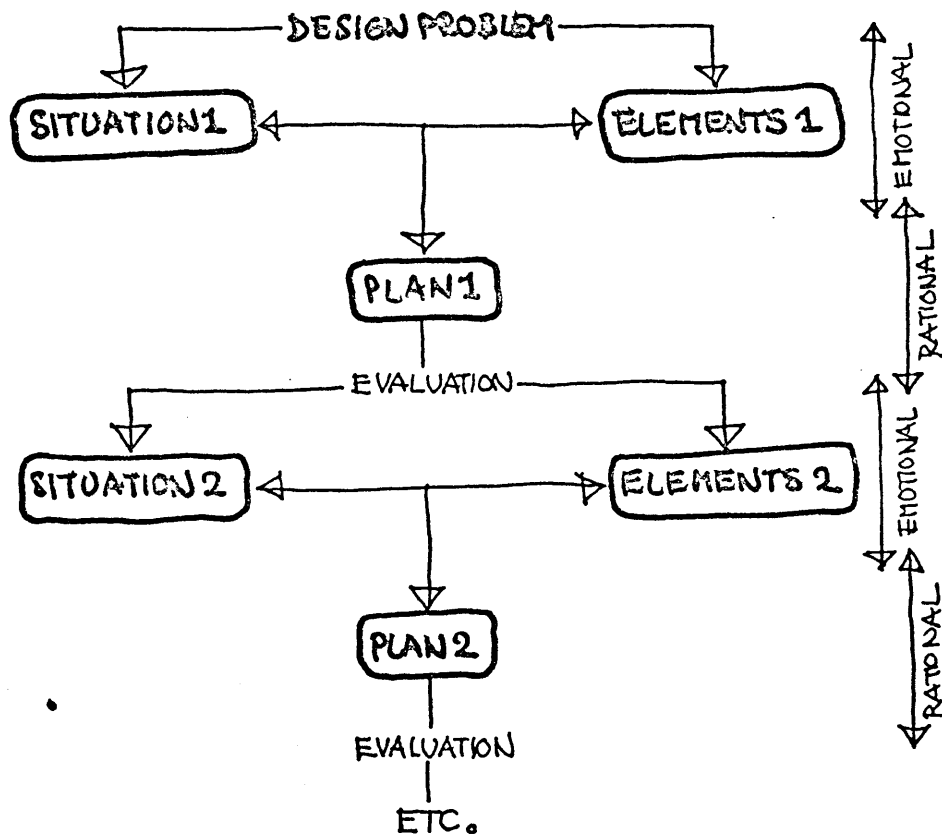
However, it is possible to start with a material result and describe the non-material aspects placed in the background (physical plan). This situation will occur when our design results must be evaluated during an ongoing physical planning process. Once the results have been analyzed, we will have very often reached the conclusion that the starting points must again be reviewed, which means we must return to a non-material situation.

Deduction  
Induction

Another alternative is to start with a general conception and proceed to work out the details. A design process can be achieved deductively or inductively; and in many instances, both methods are used. Working deductively indicate proceeding from a general concept to specific aspects. This generality is "a priori"; the general concept is accepted as correct. Working inductively means observing specific aspects and working toward a general concept. Since judging some aspects as being specific involves our perception of a certain situation, we will call these judgments "a posteriori". However, there always will be a possibility that an "a priori" judgment of a situation will be changed because, when we are going through a design process, our experiences and perceptions can influence the image of this general statement.

Going through a design process means: setting starting points, standards, data, processing data, evaluating results, reviewing standards and data, etc. This means all our standards have only been set when a design problem has been completed and a final solution reached. Designing does not mean developing a result out of one invariable set of data!

Someone involved in a physical planning process will be constantly involved in evaluation problems. He must be prepared to judge many aspects (either a priori or a posteriori) and situations. Setting new data will also mean that he has to be creative. He will also have to estimate the user's value of different and very often noncomparative items. Therefore, we will be confronted with an approach which will be at times not a totally rational process. Otherwise, processing the data and comparing out solutions with already existing results can be done in a very rational and objective way.



We do not wish to describe here in detail all of the numerous ethical aspects which are related to design problems and to physical planning processes. However, during the design process, we must constantly be aware of the social and ethical consequences of our decisions, especially when confronting large development problems.