

Three Process Modes of Urban Growth Design

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Based on theoretical work on process oriented architecture and urbanism as well as professional urban projects, the author has identified and proposes a typology of three process modes of urban growth design or city building (when built). These three particular modes of urban growth design are presented as part of a larger framework of thought, theory and practice which may be characterized as being built on humanistic and organicsystemic principles.¹ In this framework, the emphasis is on process and processes of physical urban growth and the possibilities which can be found within physical urban and architectural process at various levels of scale. While the author is particularly interested in value which may be characterized as "living structure" or "living process," he recently has also cooperated on projects where other kinds of values are prevalent. The main purpose of the paper is to discuss a process oriented approach to urban growth design and architecture and to provide urban strategies based on process which can be applied practically in projects and which also can be incorporated, at least in part, into more general modes, theories and practices of urban growth design, city building and urban development.

THREE PROCESS MODES OF URBAN GROWTH DESIGN OR CITY BUILDING

Over the last twenty years I have developed and carried out various urban growth design or city building projects, either as theories, or projects or built projects for urban areas, communities, neighborhoods and urban villages. All these projects were developed from the position of a particular design philosophy, which essentially may be described as a philosophy, based on humanistic and organic or systemic principles, starting with the two ideas of first, "wholeness in the structure of the city" and second, "the city as a growing whole."² I first became aware of these two ideas about 25 years ago, when I was working on the revitalization of a neglected area in the peninsula of Istria, the former Yugoslavia and today Croatia. Here, especially the study of the historic town of Motovun was illuminating since I was able to observe some rather fascinating features about this town, such as a particular growth pattern which emerged over a long period of several hundred years. I was also able to analyze the physical structure of the town which reflects this growth pattern in a structure of overlapping and interconnected urban and building entities. Whenever town structures such as streets, plazas, public courtyards and other spaces overlap, they are marked by special buildings and public functions.³

A more well known and often cited example of what is referred to as organic or systemic urban growth is the historic growth of the inner city of Amsterdam which has been well described by Lewis Mumford.⁴ But organic urban growth should not be misinterpreted as unplanned, as Spiro Kostof points out:

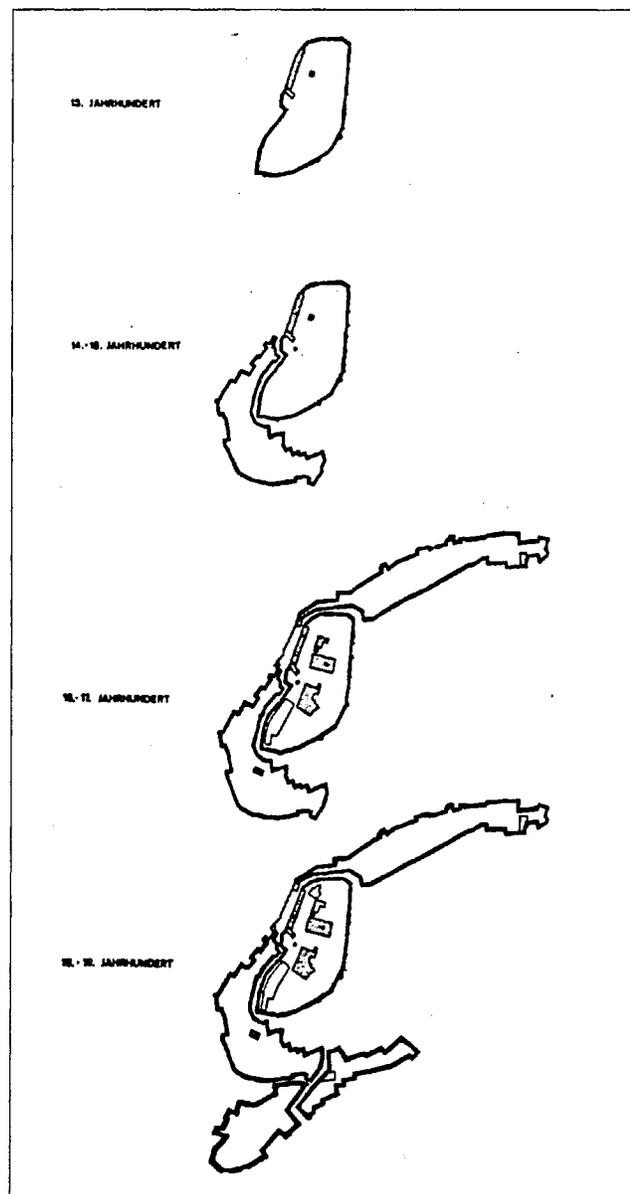


Fig. 1. Historic growth of the town of Motovun in 4 stages from the 13th to the 19th century.

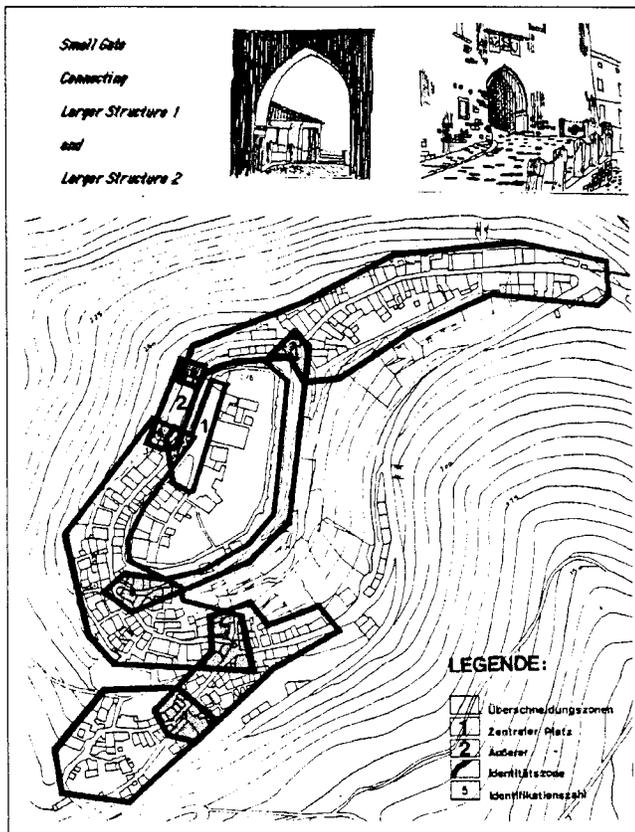


Fig. 2. Motovun: Overlapping urban structures marked by special buildings and public functions.

The fact is that no city, however arbitrary its form may appear to us, can be said to be “unplanned.” Beneath the strangest twist of lane or alley, behind the most fitfully bounded public place, lies an order beholden to prior occupation, to the features of the land, to long established conventions of the social contract, to a string of compromises between individual rights and the common will.⁵

I agree with Kostof because the introduction of process principles into the urban design and urban growth process makes the overall process even more planned or systemic, and the amount of effort and work we have to accomplish increases. However, Kevin Lynch states: “Cities are no organisms ... they do not grow and change of themselves, or reproduce or repair themselves.”⁶ And again Spiro Kostof: “It is human purpose and human willfulness that drives, the making of cities.”⁷ And for this reason humans may very well apply processes for the making of cities which are based on ideas of living or systemic structures.

The idea of “a growing whole” or “the city as a growing whole,” obviously, is process oriented, so that we have to ask ourselves the question, what kind of detailed principles, procedures and techniques are needed to achieve the quality of what is called wholeness or centeredness or fieldness in the structure of the city. Over a period of time various principles and rules or systems of rules were developed as part of projects or urban theories. These include principles such as: 1. Formation of centers and fields of centers; 2. Structure preserving transformation; 3. Spatial-Geometrical properties; 4. Organic urban order; 5. Piecemeal or incremental growth; 6. Step by step formation; 7. Creation of positive urban space; 8. Participation; 9. Patterns and Project language, plus the very important principle of 10. Continuous design and construction, which requires new integrated processes in architecture and urban design.

All of these have been explained in detail elsewhere in various publications.⁸ The purpose in this paper is not to explain the theoretical underpinning but to focus on three different modes of urban growth design which have emerged in the process of developing theory and in the process of applying theory to various urban projects.

THREE GENERAL MODES OF URBAN DEVELOPMENT

In this paper I am concerned with three specific modes of urban growth design or city building and with three general modes or models of urban growth or urban development. In order to distinguish the three specific modes from the general modes let me start to give a short description of the general modes, which are also the modes we are more familiar with: Mode 1: Standard Urban Development Model; Mode 2: Archetype/Prototype Urban Development Model; and Mode 3: System of Rules Development Model

Mode 1: Standard Urban Development Model: The urban structure developed according to a definite physical plan.

This is the most typical case: the urban structure grows or is being developed according to a definite physical plan. In this process the urban structure is conceived, designed, and built as a complete and comprehensive entity. An urban structure is designed in plan and model and also built according to plan, sometimes it is built in stages with the involvement of different architects. This model we can find applied in many American urban projects, housing areas and other kinds of developments where a developer typically follows such a model. Also recent Congress for New Urbanism (CNU) projects which work with a particular set of patterns and rules for the densification of the inner city and suburbia may be considered part of this mode.⁹ For urban projects in Europe, which are similar to what I consider the first mode, the design and construction of Kirchsteigfeld in Potsdam by Rob Krier is also, as is the design and construction of Poundbury by Leon Krier.

Mode 2: Archetype/Prototype Urban Development Model: The urban structure developed according to a prototype physical plan with the possibility for variations.

In the second case a prototype neighborhood or urban area is first developed in plan. Then this prototype is built in a particular place with variations which are required by the particular situation, such as particularities of landscape. An historical example of this kind of model can be seen in the Plan of St. Gall which served as an archetype for various monastery buildings of the Benedictine Order.¹⁰ Currently, this mode is being followed in many new city developments, in which a city is made up of several neighborhoods, each developed according to one particular prototype as seen in Brasilia, or Abuja in Nigeria or Chandigarh in India.

Mode 3: The System of Rules Development Model: The urban structure developed according to a system of rules.

In the third case there is no physical plan at the beginning of design and construction. Instead, the plan is embedded in a system of rules, with the possibility of virtually limitless manifestations. It is in the process of urban growth for a particular urban project such as a neighborhood, that the particular urban structure gets its spatial organization and physical face. A grand example of this mode may be seen in any of the numerous Latin American towns, such as Guatemala Antigua, which were born from the codes set forth by Philip II in the “Law of the Indies” from 1573.¹¹ Or cities West of

the Ohio in America, which all were laid out according to a 64 square-mile subdivision, may be seen as another historical case in this mode.¹²

Starting with this very general typology my main purpose is to present the same three modes of urban growth design within a specific framework of thought, theory and practice. In this specific framework, the emphasis is on processes of urban growth and the possibilities which can be found within urban and architectural process at various levels of scale.

These three specific modes have one characteristic in common: They rely on particular principles, processes and procedures of growth. The before mentioned principles, with their detailed rules, procedures and techniques, form the backbone for many of the urban projects which I have attempted. And from these various urban projects, each with its particular set of principles and rules, the three specific process types of development, or urban growth design, or three basic integrated process modes of city building can be identified: Process Mode 1: The Standard Integrated Urban Growth Model; Process Mode 2: The Integrated Archetype Urban Growth Model; and Process Mode 3: The Integrated Dynamic System of Rules Growth Model. Let me introduce these three main urban process modes and exemplify them with projects and case studies.

PROCESS MODE 1: THE STANDARD INTEGRATED URBAN GROWTH MODEL

The urban structure emerges out of an integrated process of planning, design and construction.

This first process mode of urban growth design or city building is similar to the more general mode: the overall project is being developed first, as a definite physical plan and the whole area is being developed according to this plan. What is different in this specific mode is the emphasis on process, feedback, adaptation, fine-tuning in the overall process. We may say then that the particular urban quality in a process mode 1 project grows out of an integrated process of planning, design and construction — a process of building in which design is embedded in the process of construction and throughout the project to its completion. Examples of built projects where we have applied this process mode include the Eishin High School and College Campus in Japan and the Agate/Amazon Urban Village for family student housing in Eugene, Oregon.¹³

The Eishin Campus is of particular interest here because it was developed with a set of principles which made it possible to integrate design and construction very early in the process. The dynamic process of staking out this large site directly and working on this layout in numerous repeated feed back loops exemplifies the process of fine adaptation and modification towards an experiential spatial quality not only on the level of the site plan but also on the level of buildings which themselves have been developed in stake-outs.

The Agate-Amazon project which was developed in a similar fashion with site stake-outs and the search for experiential quality of space and buildings is of interest here because this project was designed and partially built within a very tight budget, as a low cost housing project but featuring high qualities of positive outdoor space.

The latest in the series of these projects is the Parkstadt Unterliederbach, or Park City project in Frankfurt/ Germany. Located on the outskirts of Frankfurt near a light rail transit station, the new Park City (PHASE I) covers 9 hectares and is comprised of about 700 units of housing with shops and communal facilities along the main street of the city. The entire Park City project was designed as a master plan by Berghof-Landes-Rang (BLR), an architecture firm in Frankfurt, and then the project was divided up into about eight to twelve parcels and distributed to different architects for further interpretation and development. We CES and my own company HNA were entrusted with the North East Corner of the site with 1 ha of land. We have developed this part of the city with a set

of urban growth design principles including: participation, patterns, integrated design and construction, formation of positive open space and other more detailed principles. The Park City is currently under construction.¹⁴

Looking at other kinds of contemporary urban projects, beyond my own approach and including other kinds of urban philosophies, such as the development of the town of Seaside in Florida, by Duany and Plater-Zyberk, which comes out of the Congress for New Urbanism (CNU) philosophy in the USA, we may observe that this project shares some similarities to the first process mode or model. In particular it shares the basic characteristic an urban structure growing according to a definite physical plan.¹⁵

PROCESS MODE 2: THE INTEGRATED ARCHETYPE URBAN GROWTH MODEL

The urban structure grows according to an archetypal physical plan and according to an integrated process of planning, design and construction with the need and provision for variations at various levels of urban and building scales.

In this second process mode an archetype or prototype for an urban structure, such as an urban neighborhood, is developed as a design in detail both in plan and model. This prototype model is then adapted as applied in actual places. The quality of the urban structure potentially grows out of the process of multiple variations and reformations of the prototype which arise from each unique situation, such as the actual needs of people, the features of landscape and the needs of the process itself. Within our own approach, we have used this mode for the New Town Guasare Design in Venezuela as well as a Moshav Design in Israel.

The Plan for the new Town of Guasare was developed in cooperation with Kevin Lynch by CES and ISA in 1982.¹⁶ It shows an organic or systemic growth process at several levels of scale from the urban neighborhood to the details of the house, including construction. This project may be best understood by distinguishing between A) the development of a prototypical neighborhood, and B) the simulation of growth patterns of the neighborhoods resulting in particular phenotypes.

It is significant in this urban project that the idea of the prototype was applied first in the overall urban prototype and again in the various house prototypes. These prototypical house designs were then designed as phenotypes within the overall growth simulation of the neighborhood. Their own growth procedures as house growth is linked to the available resources of house occupants.

MODEL 3: THE DYNAMIC SYSTEM OF RULES GROWTH MODEL

The urban structure grows according to a system of rules in a dynamic and integrated process of planning, design and construction.

In the third process mode at the beginning of architectural design and construction, there is no finished physical plan or prototype for the final urban structure. Instead the plan is embedded within a system of rules which carry the possibility of endless manifestations and mutations within one coherent framework. In this process a particular urban structure, an urban neighborhood or an urban village for example, grows step by step as each element of structure is added in relation to the previous step according to the defined system of rules. The quality of the urban structure emerges out of this generative process of growth within its detailed set of principles. This third procedure, has to my knowledge never been attempted or materialized in modern urban design practice, and only exists as a theory, spearheaded in the book, *A New Theory of Urban Design*. Here, the San Francisco Waterfront Project, served as the first project in which this kind of dynamic approach to urban growth and development was simulated.

In the SF Waterfront Project one of the main purposes was to

achieve in modern form some of the positive qualities of the venerable cities of the past. At the time we theorized that the best way to achieve this kind of quality is through a new kind of process of incremental growth, in which every participant plays an important part in the overall development of the urban area. This basic idea was called "a growing whole," and based on this idea we formulated a system of rules according to which an urban area could grow. These rules include two meta-rules and the following seven detailed organizational and process rules: 1. Piecemeal Growth; 2. Positive Urban Space; 3. Vision; 4. Structuring Wholes; 5. Rules for the Layout of large Buildings; 6. Construction Rules; 7. Formation of Centers and Fields of Centers.

The part of San Francisco — which we have created in this first experimental simulation, does have some of the positive character and structure we see in old cities. It does have some of the organic, personal, and human character which we associate with many beautiful cities of the past. And it does not have the obsessive, dead character of many recent "urban design" projects. But we also have to say that the success is partial. 1. The structure of the city is not as deep as we had hoped for. 2. There are also some practical problems with implementation.

One of the important questions at this moment therefore is to find a particular urban situation for implementing this process in a real project, and to find a client who actually wants to apply this new kind of incremental urban development. The practical cooperation with the Housing Company Hoechst Bauen und Wohnen and its director Dr. Kloetsch gave us a concrete urban design theme and a project location, namely the Park City II site in Frankfurt Germany, on which we are testing the ideas and methods which emerged out of this process. The practical interest of a client in this kind of innovative theory therefore was another incentive to investigate this new urban theory further.

Frankfurt Park City II is an area adjacent to Park City I. It will be the main next stage in the overall development of the Park City. It is planned for about 1400 families, that is twice the size of Park City I. But what is most important is that the project is under consideration and investigation for development according to the System of Rules Model under discussion here. Consequently new urban design experimental simulations were prepared and carried out. The first simulation was carried out with students from the University of Frankfurt, and was finished in a month long study in Berkeley in March of 1997. The second simulation was carried out with students from UC Berkeley and finished in May of 1997. The main research question of these experiments was to develop a specific and particular process (including a set or system of rules) which can be applied in the context of the Parkstadt II situation.

In this new cultural context and working environment of the Frankfurt urban game experiment, only four of the original rules were kept and one new rule was introduced by Wolfgang Rang, that of the "formation of inner pictures."¹⁷ Each student had to develop 45 projects at different scales as part of the urban game project. One of these projects had to be designed in more detail at an architectural scale with a larger model and detailed plans, elevations and sections. In particular we asked the students to provide and design some element which makes a clear contribution to the larger urban structure. The explicit rules applied were the following: 1. Piecemeal Urban Growth; 2. Visions and Concrete Imaginations; 3. Formation of Positive Urban Space; 4. Formation of Larger Urban Structures; 5. Formation of Inner Pictures.¹⁸

As far as the results of this experiment go, we may say that the structure of the city we have created appears rather dynamic and positive in the formation of larger structures and in the formation of overall positive urban open space. It is also visible that the structure somehow grew in a process of piecemeal growth. It certainly does not feel planned. As far as the buildings go, they appear rather idiosyncratic in their many shapes and need to be developed further to be believable. As a next step we intend to develop a more integrated implementation set of rules for this project.

FINAL NOTES

The three urban space growth models, I have presented here, formulate and implement a dynamic urban approach, in which planning, design, construction, and theory are integrated through a process oriented system of rules. This kind of approach may contribute to general tendency away from comprehensive planning in European urban design and a new tendency towards complex projects. In a time where accelerated processes have become a key feature of our lives, we need to find ways to actively incorporate integrated processes into our design, architecture and urban development. In this way we may not only be able to slow down the overheated architectural and urban process, as Juhani Pallasmaa suggests¹⁹, but we may also be able to control and enjoy the urban and architectural process more actively.

The three urban growth modes or models with their systems of dynamic rules go beyond the more static codes and procedures used in contemporary urban design projects, such as those by Duany and Plater Zyberk, Rob Krier and Leon Krier, the Urban Village Group in England, or the CNU projects in the US or projects proposed by Rem Koolhaas. What is common among our work and that of these important new urbanists is a critique of the modernist urban movement as well as a definite positive validation for the importance of density and non uni-functional zoning to create more life within the structure of our cities. What is also common is a definite understanding of the necessity of coherent urban space.²⁰ However, it is the way we attempt to achieve our common goals that we differ and it is the process in which we differ. The approach where buildings start to form the city in a piecemeal growth process may be very old but it is also new in today's planning processes in its application of this particular set of principles.

Finally, we always return to the question of having the possibility of attaining both freedom and quality in design and building urban structure. It is possible that the combination of freedom of choice and pursuit of quality may depend on the application of the "appropriate" system of rules which help us to be free and at the same time help us to more fully utilize our potential for achieving good quality in architecture and urban design.

NOTES

- ¹ For a discussion on "systemic structure" and "living structure" see: a. Fritjof Capra *The Web of Life* (New York: Doubleday, 1996); b. Christopher Alexander *The Nature of Order* (Berkeley: Oxford University Press in print).
- ² Christopher Alexander, Hajo Neis, Artemis Anninou, and Ingrid King, *A New Theory of Urban Design* (New York: Oxford University Press, 1987), pp. 10-16.
- ³ W. Funke, T. Heinrich, H. Neis, "Development Planning Istria/ Four Hilltowns/Motovun," University of Darmstadt and Herriott University, Edinburgh, 1974.
- ⁴ Lewis Mumford *The City in History* (New York: Harcourt, Brace & World, Inc. 1961), pp. 439-445.
- ⁵ Spiro Kostof, *The City Shaped* (Boston: Little, Brown and Company, 1991), p. 52.
- ⁶ Kevin Lynch, *A Theory of Good City Form* (Cambridge, Mas. London: MIT Press, 1981), p. 95.
- ⁷ Spiro Kostof (5 above), p. 53.
- ⁸ See for example: Christopher Alexander, Murray Silverstein, Shlomo Angel et al. *The Oregon Experiment* (New York: Oxford University Press, 1975).
- ⁹ See: Peter Calthorpe, *The Next American Metropolis* (New York: Princeton Architectural Press, 1993).
- ¹⁰ Lorna Price, (editor) *The Plan of St. Gall - in Brief*, (Berkeley: UC Press, 1982).
- ¹¹ Lars Lerup, *Building the Unfinished: Architecture and Human Action* (Beverly Hills/London: Sage Publications) pp. 45-58.
- ¹² John W. Reps, *The Making of Urban America* (Princeton: New Jersey: Princeton University Press 1965).

- ¹³ C. Alexander and H. Neis, *BATTLE: A Crucial Clash between Word System A and World System B* (Berkeley: Oxford University Press in print).
- ¹⁴ Hajo Neis, "Park City Unterliederbach," Paper at the Prince of Wales Urban Design Task Force, Potsdam, September 1996. Also: Exhibition Catalogue: "Masstabssprung," Deutsches Architektur-Museum, Frankfurt, 1999.
- ¹⁵ A. Duany and E. Plater-Zyberk, *Towns and Town-Making Principles* (Cambridge, MA: Harvard GSD, 1991)
- ¹⁶ Christopher Alexander, Artemis Anninou, and Martine Weissman, "The Construction of New Neighborhoods for Guasare New

- Town, Venezuela," (Berkeley: Center for Environmental Structure, 1983).
- ¹⁷ Wolfgang Rang, "Innere Bilder als Katalysator fuer Gestalt," Forschungsbericht, FH Frankfurt, 1998.
- ¹⁸ Wolfgang Rang, Hajo Neis and Harald Kloetsch "Parkstadt City-Building Step by Step Formation," FH Frankfurt/UC Berkeley, February 1997.
- ¹⁹ Juhani Pallasmaa, "Six Themes for the Next Millennium," *Architectural Review* (July, 1994).
- ²⁰ Roger Transic, *Finding Lost Space* (New York: Van Nostrand Reinhold, 1986).

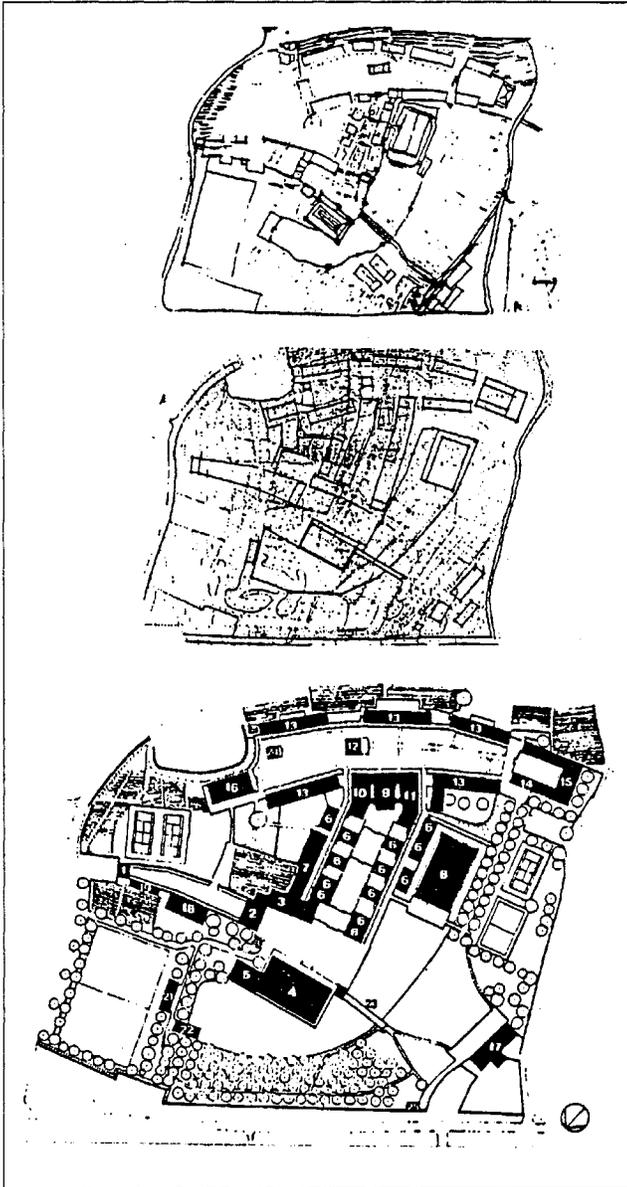


Fig. 3. MODE 1: Mapping of Eishin campus site plan in 3 stages of development.



Fig. 3a. Photo of Eishin Campus.

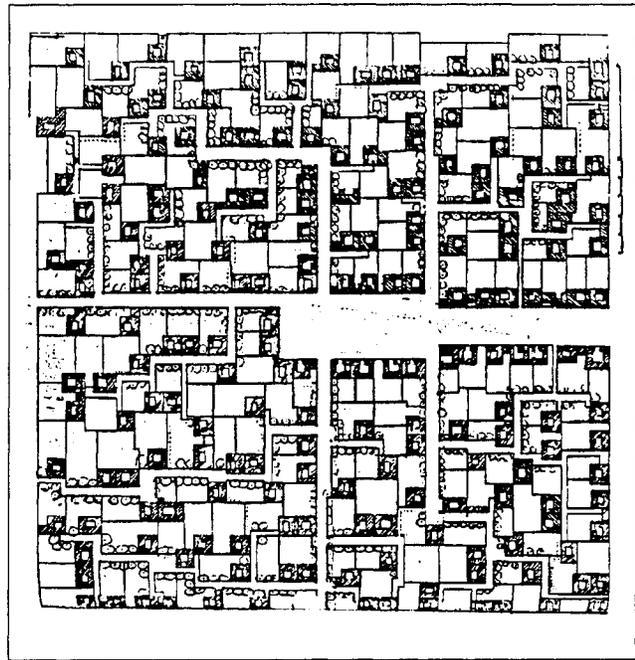


Fig. 4. MODE 2: Guasare New Town: Diagram of archetypal neighborhood.

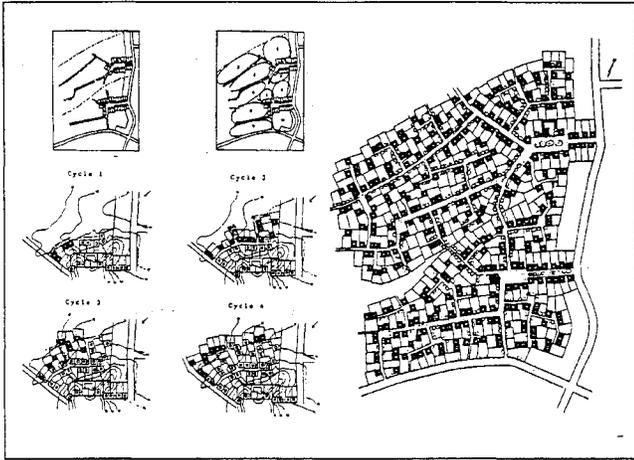


Fig. 4a. Growth simulation of beginning of layout of two neighborhoods in 7 stages of development.

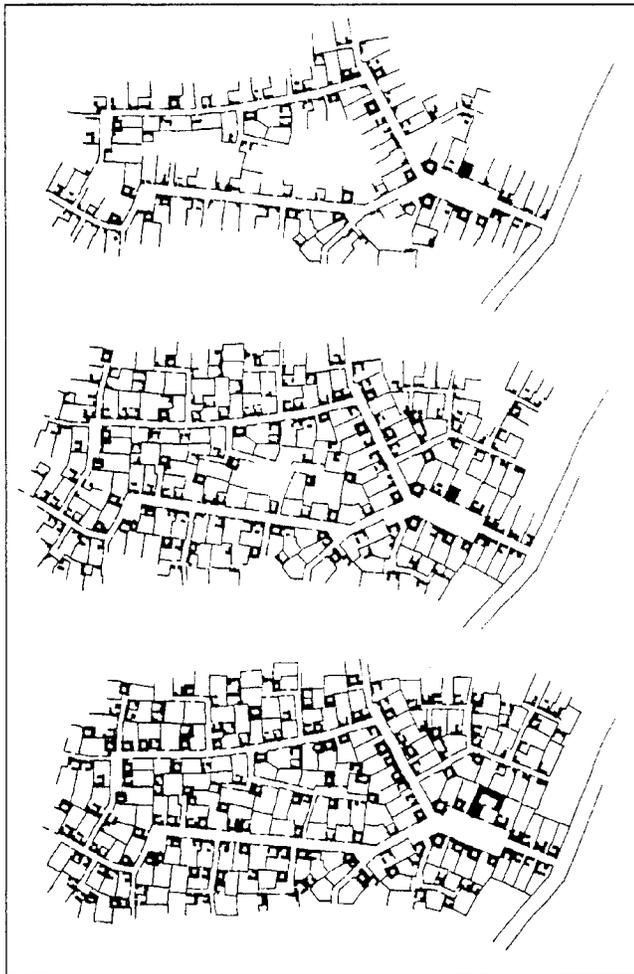


Fig. 4b. Growth simulation of one neighborhood with houses in 3 stages.

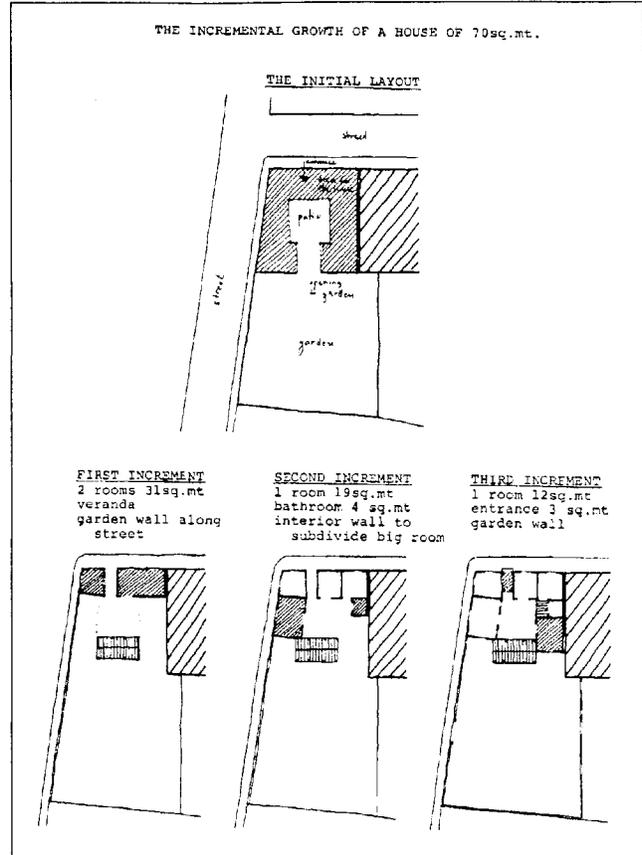


Fig. 4c. Growth simulation of one Guasare house type in 4 stages of development.

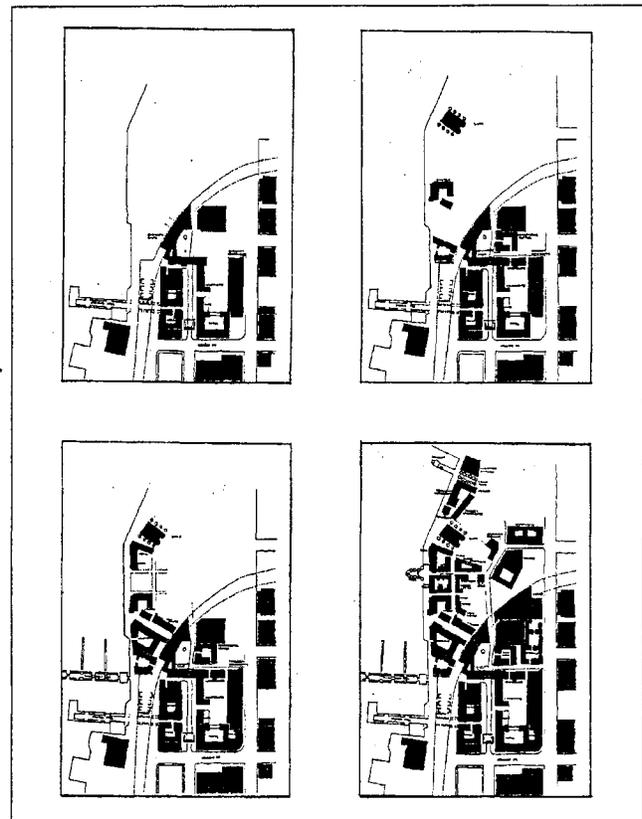


Fig. 5. MODE 3: San Francisco Waterfront Project simulation in 4 stages of development.

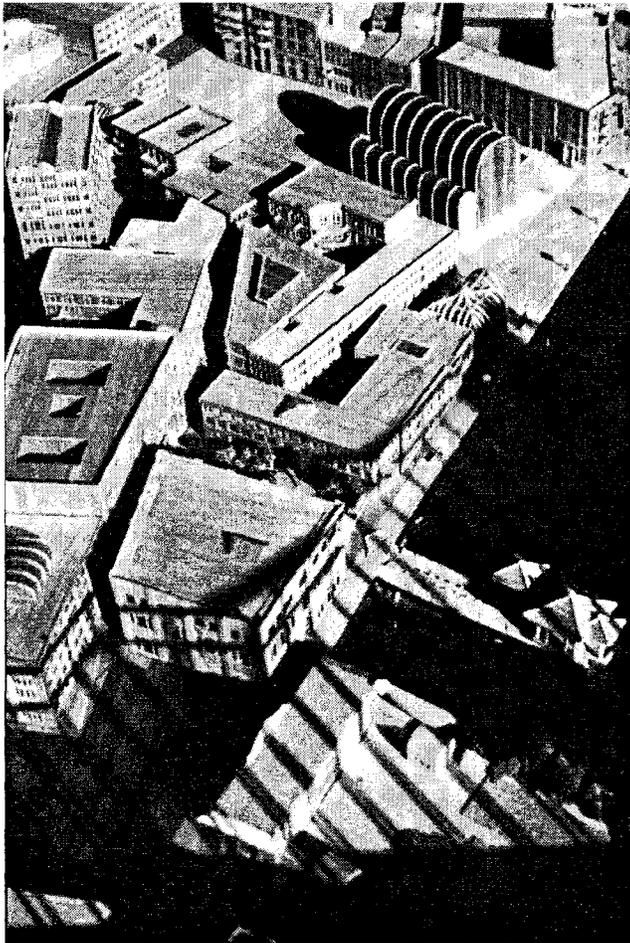


Fig. 5a. Photo of San Francisco project urban model detail.

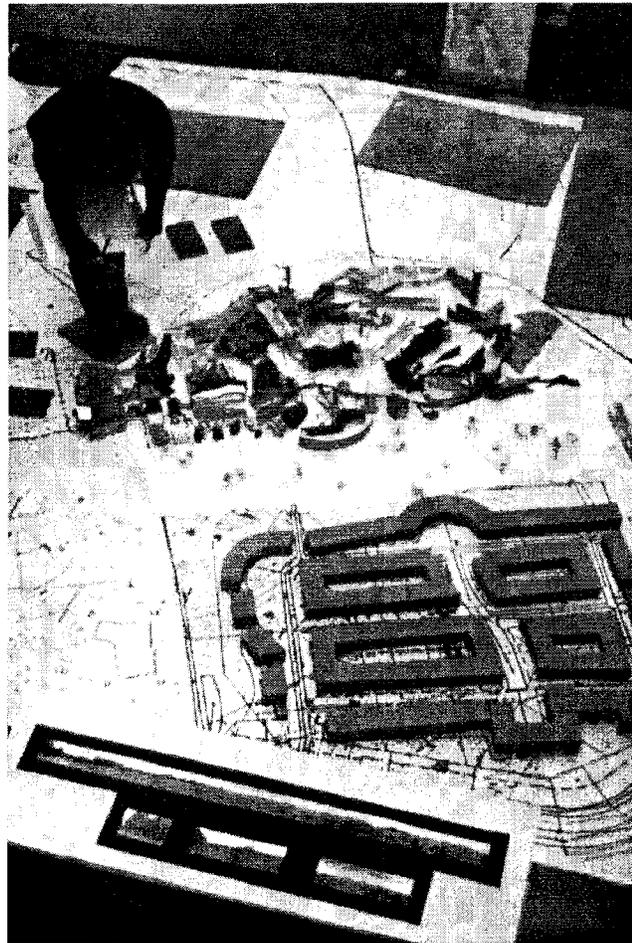


Fig. 5c. Photo of Park City II project model together with Park City I model.

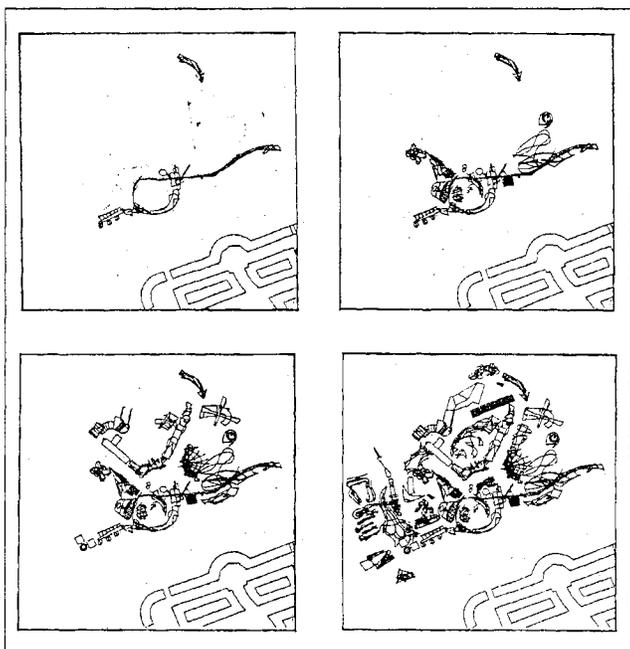


Fig. 5b. Frankfurt Park City Project II growth simulation in 4 stages of development.