PROJECTIVE ARCHITECTURE:
STUDIES TOWARD THE MEANING AND GENERATIVE LANGUAGE OF
ASSOCIATIVE BUILT FORM

by
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Projective Architecture:  
Studies Toward the Meaning and Generative Language of Associative Built Form

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Projective architecture is an attitude toward design which stems from the notion that architecture, form, and territorial definition must provide the concrete physical framework for achieving collective association and individual identification.

This thesis is an exploration of the language of projective architecture. The philosophical ground of this attitude is presented through a series of studies on observation and projection in the city of Old San Juan, Puerto Rico. It is divided in three major parts, the general intention being that the working process itself will serve as the tool for describing what projective architecture involves as an attitude.

The first part deals with the integral aspects of projective architecture: association, use, form and built; concentrating on form as generated by phenomenological forces called constants.
The second part is a series of observations in the context. These were done in four areas, each representing a different condition (as well as a different element) at the scale of the city. These were the public elements: street and plaza, and the private elements: block and unit.

The third part consists of the analysis of the structure and identity of the context based on the observation studies of part two and the subsequent projection in a site in the north section of the city, its program being housing with small scale commercial, services, and supporting activities.

Thesis Supervisor..................................................

Maurice Smith
Professor of Architecture
ABSTRACT

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BIBLIOGRAPHY
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en especial a Gail Peters, a mis hermanos Alberto, Arnaldo y Antonio, y a mis padres, sin quienes éste no hubiera sido posible. A ellos se la dedico.
This thesis is an exploration of a language, an attitude toward design. Its essence being that a projection, an architectural intervention is the continuation of a context. It is not a continuation by repeating, mimicking, or copying the existing, but by and through an understanding of the principles, rules, and relationships embodied in it. In the same way that the existing serves as context/reference for projection, the projection itself, once built, will become a reference for future projections. These projections are then seen as articulated physical frameworks, partial definitions or settings, which serve as built references/contexts for future inhabitation and intervention. It is both generative and additive, for every existing decision serves as reference for a future decision. Projective architecture is, therefore, contextual.

Seeing architecture as the making of built physical settings, it makes the distinction between the different controls that intervene, and the levels of intervention of each. It is not seen as 'made' by one individual or entity, but by many people at different levels. Each level is autonomous, each has its own rules and principles, and forces affecting and directing it. Each, however, serves as the setting for the next level of intervention. This is the basis of the balance between collective association and individual identification. Projective architecture presupposes both.
The language then deals with those interventions which people inhabit directly, and where there is a balance between collective order and individual expression. This thesis deals specifically with housing (although aspects of the work are applicable to workplaces, collective buildings, etc.). It does not negate or contradict complete and singular collective/processional buildings (such as churches, institutions, etc.).

This thesis is divided in three major parts:

1: projective architecture
2: observations and
3: analysis and projection.

The first explores the basic aspects of projective architecture: association, use, form, and built, providing the philosophical groundwork for the thesis. Association is meaning—the paramount goal of projective architecture. This, in terms of physical form, is translated into use. Form embodies both the physical definition and the principles (grammar) which support use. When form supports use, it is associative. Built is the physical realization of form and deals with the aspects of materials and processes of assemblage which make form possible.

In the second part are the observations within the context. These were done in four different sectors of the city of Old San Juan, Puerto Rico. These four areas represent the four basic elements of the city: plaza, street, block, and unit.
The third part is the analysis or interpretation of these observations as related to the structure of form. The projection, the intervention in a specific site in the north part of the city, and the analysis are presented according to their specific level of intervention. A sketch problem using Ballaja’, the abandoned military barracks of the Spanish army, as a site explores the generation of a framework through public movement. The analysis and projection explore the site at the level of the city, of the tissue, support (building), unit (plan and facade) and room.
Projective architecture is concerned with form in the sense of its intrinsic capacity to convey and project meaning and significance. Form can be supportive in meaning. But form can also be contradictory, depending on how it is used, on how we interpret it, through the values we attach to or add to it, and based on how we have been taught to see and behave. This capacity to convey meaning and significance is then dependent on the interaction between people and form - in other words: Use.

The way we use form depends on the associations which that form holds for us, and in this process we are thrown back on our experience - at the mercy, that is, of the established patterns and systems of relationships and values of the total world we are part of, as well as that part of the world we are familiar with.

Architecture, however, sensitive to the needs, hopes, and expectations of those it is supposed to serve, must represent no authority, for authority no matter who exerts it, contradicts the relevance of people being referred to. Seen through a different eye and in different situations, a form will evoke different associations, new and changing meanings.
If form is then to be a vehicle for meaning and significance, it must allow a range of individual, as well as collective, interpretations. It is this capacity to accept different but supportive interpretations within the set of agreements and system of relationships that gives people the opportunity to exercise their individuality, the basis of identification.

The understanding of the 'structure', that is the system of relationships among elements common to the different interpretations, is the basis of the understanding of the whole, the awareness of the outside world as related to oneself. It is the structure that binds the individual parts into a coherent whole. The structure is therefore the generator of the concrete physical setting in which the particular differences take place.

This concrete physical setting, if we believe in an architecture which is relevant to people, must deal with those things which are part of our day to day living. We cannot accept architecture as a luxury reserved only for those able to pay for it or for those activities so extraordinary that they don't form part of our daily life.

Architecture, and therefore form, must be the built (concrete, physical) expression of our daily existance through use. In this way, form is use and use is form. This reciprocity being the basis of projective architecture.
Projective architecture is based on the notion that architecture provides, or should provide, the concrete physical framework for achieving individual identification and collective association.

Association involves the experience of meanings as triggered by a stimulus. This stimulus may be a person, a thing, a place, or in the case of architecture, physical definition.

Architecture is concerned with how physical form, and its spatial resultant, territory, supports and reinforces particular associations or meanings.

Man's association with his environment starts with what serves as the comprehensive stage for everyday life, his immediate context, the field in which the actions of his daily existence take place. Every person has long associations with his town or city and these associations are full of memories and meanings.
We are not simply observers, detached from the play called life, but are ourselves part of it, on the stage with other participants. However, it is not other participants at a given time alone. The stage is constantly being transformed by people and forces, social and physical, over many generations. While there might be certain conditions which are stable for some time, in detail it is ever changing. There is no end, no final result, only a continuous and layered succession of phases.

Nothing then is experienced by itself, but always in relation to its surroundings and the forces, internal and external, physiological and psychological, social and cultural, manmade and natural, past and present which shape such experience.
Association, then, implies an understanding of the forces affecting our experience. The meaning or understanding of the forces involved is manifested in the way we interpret such stimuli. When dealing with form and physical definition, as stimuli, such interpretation is referred to as use.

Use, not in the exclusive and limited sense of 'function', but rather in the more inclusive sense, physical and mental, of the interaction between man and form.

When the understanding of particular meanings or associations is shared it becomes collective. Collective association is the result of the collaboration of many people over many generations. It is the result of the interaction between physical form and users influenced by social forces, such as culture, history, politics, and economics; natural forces, such as topography and climate, as well as physical forces, such as the nature of materials and the processes governing their assemblage. It is a set of agreements.
The system of relationships embodied in a set of collective agreements is called a model or theme. It is the model, this language of relationships, which binds the meaning fragments together into a coherent, understood whole.

However, for different people, under different conditions and circumstances, a form will evoke different interpretations, new and changing meanings. Architecture, and therefore form, must have the capacity to allow and accept a range of interpretations and expressions. It is precisely this range that makes possible the expression of our individuality. So before one begins to use form for the communication of a concrete association one should learn the greatest possible variety of options inherent in the relationships of the forms acting at that particular intervention.

When speaking in terms of a theme or model, these expressions of our individuality take the form of variants. The model then serves as a framework for the variants to take place.

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If the form is designed for an optimum diversity of uses, it will itself bring a great many more uses to light without in any way inhibiting the original primary function it was intended to serve.

Herman Herzberger
In languages—verbal, visual, physical—we match the flux of visual experiences with image-cliches, stereotypes of one kind or another, according to how we have been taught to see. (Inherited from our cultural environment)

And having matched the data of experience with our abstractions (associations) visual, physical, or verbal, we manipulate those associations, with or without reference to the data (form). We exercise options.

When the data (form) and our abstractions (associations) correspond...we feel at home in what we regard as our world. We feel we belong. (Form is then associative)

The language (model) then stems from the relation between form and the structure of our consciousness.

Gyorgy Kepes
The Language of Vision

Environmental images are the result of a two-way process between the observer and his environment. The environment suggests distinctions and relations, and the observer—within great adaptability and in the light of his own purposes—selects, organizes, and endows with meaning what he sees. The image so developed now limits and emphasizes what is seen, while the image itself is being tested against the filtered perceptual input in a constant interacting process. Thus the image of a given reality may vary significantly between different observers.

Kevin Lynch
The Image of the City
True association presupposes both the collective understanding as well as individual identification. The challenge of architecture lies in the ability to correlate physical form and territorial definition with the collective and individual goals, objectives, needs and expectations of those we are supposed to serve. This balance, this reciprocity between form and our associations, is the most crucial goal of architecture. It will be this balance which will enable us, as architects, to set options rather than impose solutions.
theme and variation
Uses, activities take place in territories. Territories serve as the setting in which use, the interpretation of our associations through the interaction with form, occur. Territories are then defined, articulated, and supported by form. Being built is the precondition for form and territory to become concrete realities.

Use by way of the built → to form
Form, by way of use → to territory
Territory, by way of form → to use.

In this way use, built, form and territory are aspects of the same totality, association. They are indivisible, for one cannot exist without the other.

In order to allow a number of different but supportive interpretations (associations), territories must accommodate a range of uses. This does not mean 'flexibility', as dependent on neutrality of form and lack of definition (in which everything is supposed to be possible and nothing is) - but rather on directed definition where the projected forms serve as clues, references, or physical frameworks for the interpretations or uses to occur.
Physical frameworks are not neutral, they don't suffer from lack of definition. In fact, they are dependent on the right amount of definition: the right amount for the form to act as a clue or reference, and the right amount for the territory to allow a range of interpretations. They cannot be underdefined for the form won't be able to trigger a stimulus, and they cannot be overdefined for it will become too specific; hindering all other possible interpretations. Form and territory, if they are to be responsive and supportive with respect to use, must be pluralistic and inclusive, rather than singular and exclusive.
A thing, exclusively made for one purpose, suppresses the individual because it tells him exactly how it is to be used. If the object provokes a person to determine in what way he wants to use it, it will strengthen his self identity. Merely the act of discovery elicits greater self-awareness. Therefore a form must be interpretable-in the sense that it must be conditioned to play a changing role. It must be made in such a way that the implications are posed beforehand as hidden possibilities, evocative but not openly stated. Everything must be formed so that one can make it relevant to himself according to his own nature, with adequate implications for everyone. In this sense the building acts as a framework to be filled in by everyone according to his own prediction.

Herman Herzberger
Form is the result of the interaction between external and internal forces. Every force acts in a medium, exists in a field. Any process induced by forces makes sense only in reference to its surroundings, as an interaction between the forces and the medium in which they act.

These forces are the Structure, the set of agreements and system of relationships and values about use, territorial control, and physical organization which generate the identity of form.

Identity is, then, the character of form, and Structure, the formal properties of a system of relationships.

Form is generated through three basic sets of relationships:
1: those that come from phenomenological forces or 'constancies'.
2: those informed by the context.
3: those that come from the nature of materials and their processes.
1: **Constancies**
   (A) Natural/Landscape
   1: forces in relation to physical elements
       a: continuity
       b: territorial zones
       c: zones of exchange
       d: reciprocity
       e: horizontal generation

   2: cosmic forces
      ______ course of the sun
      cardinal points
      ______ cardinal points
      prevailing winds
      ______ prevailing winds
      f: orientation
      g: direction

   3: light
      h: light

   4: temporal rhythms
      ______ time
      ______ seasons
      ______ seasons
      i: change
      j: additive quality

   (B) Man-made Place
      k: containment

2: **Context**
   (A) History
      Culture
      Tradition
      l: character of elements
      m: patterns of use
      n: nature of assemblage

   (B) Climate
      Topography

   (C) Local Materials
      Building Processes
3: Nature of Materials and Processes

(A) Type of Material

(B) Levels of Permanency

o: each material with its own process of assemblage contributes supportively to the generation of the spatial territory.
p: growth and change
q: additive assemblage

Form encourages or hinders particular ranges of uses and associations. An understanding of the associative behavior of form, then, permits the selection, assemblage, and deployment of built-definitions to support use intentions. The intrinsic behavior of particular definitions is (considered) constant and predictable.

An understanding of the structure of form behavior must begin with the order from which form is generated.
on additive and generative growth

How do things grow?
They always come from something,
they are not created.
They are continuous with their source,
they grow through movement,
they grow in certain fluid,
non mechanical but
enerative ways.
Form making is never finished
but continued
to either expand ever outwardly
(expansion to a field)
or to divide and change internally.

In this way, buildings grow from the existing
through movement
to the articulation of such movement
through the partial
definition of parts reinforcing its direction
and from there
continued growth
into the three-dimensional world
of the built environment.

THE QUALITY OF LIFE IS JUST LIKE THAT: IT CANNOT
BE MADE, BUT ONLY GENERATED.

When a thing is made, it has the will of the maker
in it. But when it is generated, it is generated,
freely, by the operation of egoless rules, acting
on the reality of the situation, and giving birth
of their own accord...
The brush stroke becomes beautiful, when it is
visible only as the end product of a process, when
the force of the process takes over the cramped
will of the maker. The maker lets go of his will,
and lets the process take over.
And just so, any thing which lives can only be
achieved as the end product of a process, whose
force takes over and replaces the willful act of
creation.

Christopher Alexander
Built form is then generated from a natural order, existing in the landscape (or field), through movement (access), from the context (site).

This idea suggests a greater relatedness and harmony between people, physical objects, society, institutions, and the unbuilt world.

It is then possible to establish and explore the intrinsic nature of things (form definitions, elements and resultant territories) and rules for their behavior so that the new generated environment will be continuous with such natural order.

These rules (constants), rather than inflexible principles, are vocabularies of building, which are employed to generate variable and responsive environments as positive extensions from, and appropriate to the context.
Through these principles we can extend our understanding of the lateral transformations of form, the nature of growth and change, of territorial definition, of materials and their processes, and of natural systems, to the way in which the generated form (movement and elements, and their further movement (growth)) support a range of associations reinforcing particular intentions regarding use.

The logical conclusion of additive growth (expanding to a field), is that the growth of the singular affects the collective form. All expressions of form making are relational in that an action / form results in other action and form responses. As a system of relativity we can, then, identify a vocabulary of relational responses and dichotomy limits (polar opposites).
(The behavioral range in a form transformation is defined through the identification of the particular polar opposites encompassing such transformation.)

Partial vocabulary of relational responses as identified through their dichotomy limits, the polar opposites they encompass.

1: continuous and intermittent structure
   continuity and separation (discontinuity)
2: reciprocity and adjacency
3: endotopic and exotopic form
4: containment and openness
5: direction and focus
6: partial definition and completion
7: collage and subdivision
Forms and forces interact in a field. External forces are those outside the form itself which affect and inform its behavior and character. These, in general, are particular to the field (context, setting) in which form acts. They might be natural (e.g., climate, topography, orientation) or man-made (history, culture, socio-political forces, economy). External forces act from the outside in. On the other hand, internal forces, the intrinsic nature characteristic of a particular family of form and the dynamic tendency of this intrinsic nature to integrate the impacts of the environment, act within their specific frames of reference. In terms of the external world, internal forces work from the inside out. External and internal forces (as manifested through the transformations of form) are constantly informing, defining, and re-defining one another.

External forces, although particular to the context, also have their intrinsic nature and behavior. Of physical external forces, perhaps two of the most crucial in terms of form are light and horizontal generation. Horizontal generation, the essence of topography, generates the use surface. Consequently, terracing gives us maximum association. Light is what allows visual perception. Light as a force (in its range of types and manifestations) reinforces territory.
1 built light ------------ 2 lineal framework 

( light equivalent of form family transformation reverse from continuous surface to framework)
3. light screen

4. 3-d screen

LIGHT
In nature, terracing, the incremental displacement of horizontal surfaces, was the consequence of the movement of water. Through time, man has used terracing in an attempt to make this use surface available. Through terracing, man 'civilized' the landscape to enable the movement (transportation) of water, to facilitate his own movement, for cultivation of comestibles, and subsequently for housing. To reinforce the horizontal is to reinforce use. Vertical dimensions are then gained through the displacement of horizontal surfaces in order to make them associatively habitable.
1: terracing through movement of water
2: cultivation
3: public movement
4: housing

HORIZONTAL GENERATION
Spatial forces cannot be described in terms of particular elements or objects, only as relationships, or as relational responses between external and internal forces. They can be described as organizational relationships which form takes in response to certain forces, external, in relation to forces acting in a field, and internal, in relation to the intrinsic nature of the elements involved. Further, even as relationships, they cannot be defined as a specific, particular condition, but only as part of a spectrum, a range.

Each range of relational responses encompasses particular polar opposites or dichotomy limits. It is then possible through the identification of these limits (and the transformation within their spectrum) to manipulate form when making territorial definition.
Note: Also an example of reciprocal definition between landscape and water at a range of sizes.

CONTINUITY of the landscape
access continuity

building continuity
The distinctive quality of the landscape is extension. This may be more or less continuous. Topography, surface relief and the landscape's horizontal dominance are physical expressions of this continuity.

Continuity, in general, reinforces the direction of movement. In this way the second basic component of the built environment, access, is principally continuous. Buildings (in a relatively packed environment), having a mutually defining (reciprocal) relation with access, are also continuous; not individually (for their basic nature is that of containment), but in their aggregation.

The three major physical environment components,  
1: living territory  
2: access, and  
3: landscape,  
offer three different continuities...each particular in form, use, and range of completion/addition, adding their particular differences together in reciprocity.
building continuity

access continuity

partial focus: emphasizing place
1: landscape continuity......essence of natural place.
2: horizontal continuity......terracing. displacement of horizontal surfaces.
3: access continuity........continuity of movement. path-place continuity.
4: building continuity.......block. collective aggregation.
5: visual continuity........extension of visual field beyond one's immediate containment.
6: light continuity..........point light aggregating to field. extension of light through a number of territories.
7: use continuity............optional extension of use to adjacent territories.
8: material continuity.......continuous surface.
9: vertical continuity.......(sectional) continuity of vision / of light / of ventilation (through convection).
The church square as the centre of interest in Olympos on the island of Chios. Chairs are clustered alongside the major through-way although there is plenty of space on other sides of the church.

Space as a social place in the village of Pirgos on the island of Tinos. The narrow street opens out into the public square (with a fountain) where café chairs are strategically placed to take in the best view of what is going on.

Left: Again in the main town of Skyros the pleasant plateia is only used during the holidays. Normally chairs are bunched in the right angles of the narrow street.
The distinctive quality of man-made place is containment or enclosure. While continuity reinforces movement, containment reinforces place. Containment's enclosing properties are made distinctive through its boundaries, while its openings make its structure visible as continuous or discontinuous extension.
Arches and vaults as containing forms
Reciprocity implies a mutuality of definition between space, form, and movement between place and physical definition, and between the elements in relation to each other. It involves an interlocking and interpenetration between each of these continuities and definitions.

Its polar opposites can be described as adjacency. It is the abutting of these continuities and definitions in a line or plane.

"The formation of higher, intermediate articulation by the interlocking of certain main elements such as the alternate shifting of a grid pattern which results in the overlapping and interpenetration in the structural pattern of a brick wall."

Klee

The Nature of Nature
The spatial exchange of built and unbuilt elements in a field generates a directional field. This field, like form, is then also generated by movement — but in relation to heavier, more permanent elements which define that field. In nature, these may be mountains and meadow, or land and water; or in the built world it may be the exchange between buildings and access, or buildings and water (which can be access, as in the case of Venice). In general, then, the direction of association is reinforced by the direction of public movement, while the discontinuities (which are the privacies or containments) are the more permanent elements which shape the field.

In the organization of a field, the ground elements (rocks) are permanent anchors or weights around which the less static and more continuous elements (sand or water) are defined. This analog can be extended to the territories of use and the physical definition of the movement field.
Rocks: the ground from which things grow (weight). Equivalent to use: privacies, containments, and discontinuities.

Sand or Water: the growing changing nature of the field (movement). Equivalent in use: shared spaces, public continuities, access.
'Rocks & Water'
Collage... simultaneous layering
 perception
 use
 ( at the city scale )... integration of functions

Subdivision... separation
 compartmentalization
 ( at the scale of the city )... segregation of functions.
COLLAGE

SUBDIVISION
"A stone, a tree, or a fish has its own particular type of existence. The stone is static with the latent perpendicular movement of its weight. The tree can expand in any direction but cannot change its position. The fish can move and take any position. Each behaves according to its specific nature."

Kepes

Families of form behave in a similar way, each according to its own nature. Positions, directions, and differences in sizes and materials are inherent qualities of these families. Although affected by external forces, the physical, cultural, and socio-political environment, these qualities remain relatively constant. Internal forces are those that shape the intrinsic properties of form families into stable entities. This 'self-stability' is dependent on the physical properties of the materials particular of each form family as manifested in the family's ability to reach, what can be called, intrinsic territoriality. This condition, the essence of self-stability, occurs when a form family is territorial without depending on its relation to additional or external physical definitions. For example, continuous surface (eg. concrete, unit masonry: when it is not planar) is by nature territorial, therefore self-stable. Lineal framework, however, being based on the aggregation of point supports, has to be three-dimensional (1: not in the physical, but spatial sense) (2: whose minimum is that of three points) to be self-stable.
Self-stability, however, is not restricted to a natural (intrinsic) level, perceptually, it involves a dimensional reciprocity between the form and the field in which it acts. This relation might be physical, for example: building(s) and landscape, or spatial; as in form and space (solid-void). This form of self-stability is perceived as a dimensional equilibrium product of the dynamic tendency toward balance between forces and their form response.
In order for (the architect) architecture to project use intentions, form (architecture) must attain reality in its own world, the built. There is a need to examine the nature of built form. The architect can never translate his value-biased impressions (into form) without first recognizing and clarifying his own domain. He must clearly understand the relationship between interpretations and physical definition, and in so doing, grant primary importance to the built phenomenon, as the physical realization of those relationships. The architect, then, has to be conscious not only of what he projects (form), but how (built) he projects it, and especially what allows him to make his generation - his tools and the rules that dictate their usage.

The way form is built is dependent on
the intrinsic properties of the families of form
the nature of materials
the process governing their assemblage, and
the behavioral range of the form families in transformation.

Built is not only a term describing the technical characteristics of form making (construction), but a qualitative term describing the generative processes of form.
Form families are identified through their direct physical attributes.
1: single-sided surface (continuous ground-form)
2: two-sided surface (inhabited ground-form)
3: partial containments (extrusions/channels)
4: planes
5: screens (from planar screens to 3-D screens)
6: lineal frameworks

Transformation: Continuous Surface to Framework.
1 and 2 block space directly, while in
3 to 6 light/space increases toward maximal openness.

Each territorial self-stable form family in transformation develops the characteristics of another,
while maintaining, recognizably,
some of its own properties.
1. single-sided surface (continuous ground form)  
2. 2-sided surface (inhabited ground-form)  
3. partial containment

families of form
4. Planes

5. Screens

6. 3-D Screens

7. Lineal Frameworks
Registration is the principle presiding over such process. It is also described as comparative movement based on the understanding that the direction of movement or generation is always relative to an existing physical reference.
Every action/decision is based on actions/decisions already made; consequently, every decision becomes a reference for the next set of decisions. Registration implies an association to what is existing. It is an association to an existing physical reference, and not to an imaginary element or line.

In general one registers to an edge. The edge determines the direction of registration. The direction of registration in a particular set of decisions can be described as justification.

One also registers/maintains a reference to three types of dimensions:

1. hand and body dimensions
   (based on human scale)
2. use dimensions
   (based on the sizes appropriate for certain activities)
3. built dimensions
   (based on the size of materials).
... maintaining a reference to an edge
Slack is a dimensional tolerance resulting from the assemblage of a series of 'fit elements' in a given registered action. As an infill decision, it is one which can be made after a whole series of actions have already been made. It demands a non coincidental relationship (dimension and position) between element(s) and opening. There are different types of slack:

1: designed slack: slack as a pre-defined or dimensionally calculable element. eg., a four ft. opening with a three ft. door and two inches at either side for framing - gives you an eight in. slack which is optionally fillable.

2: positive slack: usually horizontal. It is the gaining of a use territory through a fit-slack exchange or through a passing connection.

3: spatial slack: is the dimensional resultant of a spatial junction or a passing connection.

note: 'fit element'...pre-made, standardly manufactured element.

'slack' ....1. dimensional tolerance. 2. handcrafted element to take up this tolerance.
from recessed exterior claiming interior

2 flush

3 minimal extension

4 open balcony - single use extension
open balcony - extended to glazed-screened balcony

covered balcony

interior claiming exterior

from RECESSED BALCONY... to... GLAZED BAY

TRANSFORMATION
from: 1 cantilevered extension

2 braced to wall

---
3: propped to ground form
4: supported to ground floor

from CANTILEVER to SUPPORT
from SURFACE INTENSIFICATION
"Experiments deal with intervention into what is explored. Observation leaves the world as we find it, and is the beginning of all research. It is not just seeing: it is seeing with detachment - the suspension of knowledge and certainty. It is curiosity, before the question is asked. The answer is the end of observation and the beginning of theory. The theory leads to understanding, and the understanding makes us see the world as we could not see it before. It allows us to see more which may lead again to observation.

Observation leads to a record - a sketch, a photograph. But the record is not an observation, but rather the beginning of an answer."

Habraken

Observation is the basis for the understanding of those relationships (forces) informed by the context, the city of Old San Juan, Puerto Rico. These observations are directed toward two major goals. The first is the identification of the elements at the different sites of intervention:

1: city / urban structure / landscape
2: tissue / collective / access
3: support / building
4: unit / individual
5: room / personal

And second, the examination of the rules (relationships) regarding the range of dimensions, positions, and directions characteristic and particular to those elements.
Since the program for the projection was housing, the emphasis was on the tissue (collective) and support (building or unit aggregation) scales.

The observations were done in four different sectors of the city, each representing a different condition, nature, and character. These differences were relative to their location, basic function (residential, recreational, commercial, services, or institutional) and to the particular urban element dominant in each sector. These basic elements were identified as:

A: public elements
   1: street (pedestrian and vehicular)
   2: plaza

B: private elements
   3: block
   4: unit

The observations concentrated on how the basic unit archetype changes and transforms under different conditions.
The areas were selected not only because of their relevance (in particular those of the plaza and the pedestrian street) to the site chosen for the projection. The selected areas for observation were:

1: street:
   pedestrian: Callejon del Hospital
   vehicular: San Sebastian (residential)

2: plaza:
   Plaza San Jose (including church)
   San Sebastian Street (commercial)

3: block:
   block bounded by Luna
   Sol
   San Jose and
   Cruz Streets
   (residential and commercial)

4: unit:
   Sol Street (residential)
plaza san José
calle san sebastián

PLAZA 99
3

ANALYSIS OF STRUCTURE AND PROJECTION
The analysis of the structure of the context and the projection in the site are mutually supportive, therefore, they are being presented together. These are organized according to their particular level or size of intervention, being divided into the following:

- level of the city (urban structure)
- level of the tissue (public collective and movement)
- level of the support (building and unit aggregation)
- level of the unit (individual)
- level of the room (personal).

As mentioned in the last section, the analysis was directed at the identification of the public and private elements as well as the rules prevalent in the context regarding their assemblage and generation. These rules dealt basically with three aspects:

- position
- dimension and
- direction.

These were used to generate a reciprocal relation between the three major built-environment continuities:

- building
- access and
- landscape.

THIRD INTRODUCTION
Naturally, it is impossible to understand the structure and identity of the urban form of Old San Juan (or any context) without a background understanding of the technological and economical basis, as well as the socio-political forces from which it developed. What follows is a preliminary background of these forces as related to physical form.

The history of Old San Juan spans over four centuries, starting with the removal in 1521 of the first permanent colony in Puerto Rico - from Caparra to the islet of San Juan.

As in other colonies in the Caribbean, the main concern during the XVII century was to build defenses against the Dutch, the English and other enemies at this time. Building fortifications was then emphasized at the expense of domestic construction; religious and residential architecture exhibited only the simple techniques of construction, similar to those practiced in small Andalusian towns. The settlement followed the planning policy of "Las Leyes de Indias" which provided the characteristic layout for towns in Spanish colonies - the gridded street pattern around a main plaza.
In San Juan, like other pre-industrial cities, the land use scheme was the opposite of the present scheme in industrial cities:

1: The shape of the city wasn't determined by the buildings of economical importance (as in our modern cities), but by the seats of power (church, state, etc).

2: The elite of society lived in the central nucleus, while the lower class groups lived in the outskirts of the city.

3: Frequently one area, or one building was used for different functions.

4: The public spaces prevailed over those of private use.

The urban structure was determined by the lack of development in communication and transportation systems. Since most of the resources were allocated in building defense fortifications, existing resources were limited to satisfy only the basic needs of the population.
This insufficiency justified the association between the dwelling and the place of work, as well as for the narrowness of the streets. Aside from the main vehicular roads, the street network was formed by the spaces between houses. The narrow streets then corresponded to their only function: to provide access to the dwelling units. This narrowness was also imposed by the fact that San Juan, being an islet walled by defense fortifications, didn't permit the gradual expansion of the city parallel to the growth in population.

The social elite lived in the center in order to have better access to the principal social institutions (church, state, market, etc.), and for better protection in case of a military attack. The architectural emphasis was given to those buildings of ideological importance.

The stress in design of public space, as opposed to private, is also derived from the existing economical conditions. The families were units of production more than of consumption. The recreational activities were then transferred to the public space, since the domestic environment was a place of work more than one of recreation.
Aquí es la ciudad de Puerto Rico
The construction of inward looking dwellings with interior patios insured personal privacy, while the balconies were the physical connection to the life that took place in the public space. This functional equilibrium between streets and dwellings made the plazas the most important element in the urban system. The basic elements of the town planning were not the streets or roads, but the dwelling units (the private realm) and the plazas (the public realm).

The city that was born from the organization of units around a square, then grew by squares in a biological way, by triggering off a process of splitting and duplicating each time an existing square had reached the fulfillment of its communal function. The urban form of San Juan developed then from a system of squares, and not one of streets like in our modern cities. The square provided the framework within which some of the most important political, cultural, and social relationships are embedded.
PLAZAS

146
san juan
PEDESTRIAN STREETS

150
Being based on "Las Leyes de Indias", the physical structure of San Juan was the product of an explicit system. The individual character of its buildings, however, was the product of an implicit system based on the building tradition, the culture, and the understanding of the tropics by the Spanish. These systems, explicit and implicit, determined the theme which each intervention, a variant on the theme, would have in common. This developed an environment in which public and private, built, and unbuilt, collective and individual, contributed positively in a process of mutual definition. The relation between place of living and workplace created a continuity of form which held a variety of uses, rather than segregated areas each containing different functions. The variants supported the individuality of the person while the theme maintained the integrity and coherence of the whole.
The level of the tissue embodies the scale of interrelations smaller than the urban structure and larger than the individual buildings. The urban structure includes major transportation arteries, major public functions and facilities, and the global designation of density and use of urban areas. The single building usually has clear boundaries within a specific site. The tissue level is that scale where a large number of discrete architectural interventions come together into a larger whole and are integrated with streets and public spaces to fill the blank spots in the urban structure.

Interventions at the level of the tissue must be based on intentions with respect to the urban structure. These intentions establish the relationships between the site, movement systems, and the major collective nodes of the city.
The basic intentions at the level of the tissue could be outlined as follows:

1: To extend the north-south pedestrian network defined by Callejon de las Monjas and Callejon del Hospital. (illustration 1.)

2: To liberate the Ballajá Plaza, making it available as a positive urban element rather than an abandoned, self-contained open space. (illustration 2.)

3: To build the west edge of Plaza San José in order to mend the urban vacuum created by the empty parking lot(s); restoring it to its proper degree of definition. (illustration 2.)

4: To create a public continuity between the landscape of El Morro and the city, using as a tool the interpenetration of the 'green' and 'built' landscapes. (illustration 3.)

5: To re-route the vehicular traffic to make these public (pedestrian) continuities possible, allowing the development of a public node at the beginning of the promenade leading to El Morro. (illustration 2.)
The site is located on the northwest edge of the city, its boundaries being Boulevard del Valle on the north, Cristo St. to the east, San Sebastian St. on the south, and Morivivi St. on the west. Its southern section lies on the crest of a hill - the highest point of the city. From it one can see the ocean to both the north and the south. The site then slopes down to Boulevard del Valle which ends at the entrance to El Morro. The city's walls lie beyond this park and fortress.

Major institutional, governmental, public, and recreational buildings adjoin as well as define the site. These are: El Morro on the north,
San Jose Church
Plaza San Jose and
The Dominican Convent (now the Institute of culture) on the east.

Commercial buildings and
The Cardenal's residence on San Sebastian to the south,
and,
Ballaja (abandoned barracks and headquarters of the Spanish and American military) and,
Hospital Rodriguez (presently occupied by the department of Public Education) on the west.
The site has been used as a parking lot since the demolition of previously existing residential buildings. This created an urban vacuum in terms of physical definition as well as the balance of urban functions. Ballaja is abandoned and in a severe state of deterioration.

The projection proposes housing as the program for the site. It would be accompanied by small-scale supportive functions such as commerce, offices, work studios, etc. Ballaja could hold larger functions as well as those already mentioned. These could range from a public market, a parador (inn), public services such as day care for children, or government offices. The intent, however, is that it will be pluralistic in use and not controlled by a single function - a microcosm of the city.

Housing was selected as a principal use for a number of reasons:

1: First and most obvious, is to propose a positive alternative to the problem of housing shortage in the city.

2: To restore the city to its proper degree of definition, integrating the studied area to the rest of the tissue.

3: To restore the balance between functions (now dominated by institutional and governmental buildings which only yield day time activity, leaving the area desolate and unsafe at night).

The revitalization of the area at the level of the tissue is crucial if the intentions at the level of the city are to be realized.
SUPPORT AND UNIT
The elements and their dimensions were determined by the context as identified in the analysis:

the zaguán = shared entry (vestibule)
the patio = interior open space
the collective quarters = salón (living), dining, kitchen, working, etc.
the private quarters = bedrooms and bathrooms.

The relative position of these elements with respect to each other (zaguán-patio, patio-salón, salón-gallery, etc.) and with the exterior (salón-street, etc.) also remained constant.

The design, however, involved a field organization in the collective parts of the unit using the patio as a 'rock' (unbuilt) which defined the territories and movement around it. This continuous flow between territories contrasted the subdivisive and compartmentalized nature of the organization in the original structures of the city.
The single-use boxes characteristic of classical subdivision were done away with in favor of physical continuity. This brought the opportunity for each territory to be interpreted in a different way (use) (pluralism vs. singularity). It also allowed visual continuity, continuity of light and, perhaps more crucial in the tropics, continuity of ventilation. Having less barriers (full-height walls separating rooms) inside the unit, high ceilings, and patios, air was able to flow through cross ventilation and convection. (Ventilation then being based on natural means rather than on artificial and mechanical systems such as air conditioning, which are not only discontinuous with natural processes, but unhealthy (due to the extreme temperature changes between inside-outside) and economically prohibitive and irresponsible in times such as ours where energy is no longer a commodity but a luxury).

The support allowed, through the manipulation of secondary structure (unit masonry and wood), the more complete containment of the private areas. These, however, were able to accept changes in time due to the less permanent nature of the secondary systems.
ZAGUÁN

170
GALLERY
PATIO

private

174
SUPPORT SYSTEMS: PATIOS

center

side

side extending to focus

side-back

DIRECTIONAL
ENTRIES

PATIOS

Diagramatic Summary of Support Systems
original structure  transformation

CHANGE
LEVELS OF PERMANENCY... from MOST TO LEAST PERMANENT
These studies (done between September 1980 and May 1981) concentrated on the generation of the patio as a continuity of internal use, which, organizationally took the form of a 'negative (unbuilt) rock' (1), and as the third component of the partial containment-continuity diagram (2). The patio was first positioned against the direction of movement of the unit so as to gain maximum definition at either side, but it was subsequently changed to reinforce such direction due to the width of the units.

The patio was seen as the 'lungs' of the support. It not only allowed cross ventilation and convection but it was also the light source and the major collective place at the unit level.
1: patio as a negative "rock"

2: three part containment diagram

3: patio diagram
public place

unit

two units sharing a zaguán
The illustration shows an exploration investigating the possibility of a garage in the back part of the unit through the use of a split level. It also shows the basic position of the elements zaguan, patio, salon, etc. as they were to remain in the subsequent stages.
The identity and identification of the occupant with their dwellings was the starting point of the projection at the level of the building. As well, of course, as the notion of the project as an extension (both physical and associative) of the context.

This generated a support structure, a partial/incomplete physical framework which would serve as both a concrete built reference and as the context (site) for the intervention of those who, at a later stage, would inhabit it. This implied a design which allowed for a wide range of possibilities regarding use, not only for the immediate inhabitation, but through time, as changes in needs, tenants, taste, etc. would require.

In order to insure this range, the support had to (dimensionally) accommodate a spectrum of conditions, both in terms of sizes of units as well as in program. Variations range from a studio (efficiency) unit to one large enough for an extended family. A number of options were also included regarding control (ownership): two stories - single ownership

two stories - separate (double) ownership,

and aside from housing, the possibility of small scale non residential uses such as commercial, offices, working studios (ateliers), etc.
The framework system was composed of six support types: two corner supports (numbers 1 and 6) and four which belonged to the middle section of the block. Type 2 was a support with parallel bearing/party walls, and was to be aggregated individually. Numbers 3 and 5 were to be aggregated as a pair and they shared a displaced bearing wall. This displacement allowed for the lateral expansion of either 3 or 5 into the territory labeled 4. This allowed the possibility of a tenant to own his dwelling (3 or 5) and have his commerce, workshop or office in unit type 4. This unit, product of the interaction between types 3 and 5, served as sort of a slack in the support system. It could hold a studio apartment, a commerce, an office, or serve as an outdoor place, claimed by the street or by the two units as a shared courtyard.

The design accommodated the possibility of multiple patios and two major positions for stairs. In the case of a separate control between the first and second story, the stairs are in the front zone of the support taking the form of a zaguan (zone A-1). When the first and second story have common ownership, the stairs are positioned in the interior of the unit (zone A-2).
VARIANTS ON UNIT TYPE no.4

1 commercial
   office
   studio apartment

2

3

4

support

5

6

7 common patio
DIAGRAMMATIC SECTIONS
These sectional studies explored the development of a double patio, aiming for a mechanism which would allow the privacy of the first story patio with respect to the second story, as well as the provision of an interior open space for the second story.
Comparison between the grain of the existing structure and that of the projection. Note both the similarities in dimension and position as well as the difference between the field and subdivisive organizations.
Form elements have meaning, both in the physical (use) as well as the psychological sense. What is the essence of a door or a balcony? A door can be seen as the setting for entering and leaving, arrival and departure. It can also be seen as the echo of man moving through space. A balcony is the extension of man's interior realm (house) into the exterior (city) - a zone of exchange between public and private. Isn't a patio a plaza at the level of the house, and a plaza a patio at the level of the city? The facade or interface zone embodies all of these associations, entering-leaving, public-private, inside-outside, collective-individual. It is the zone in which these polarities are negotiated. It is not an inbetween zone, a line or a plane, but a place territory in its own right and with an existence particular to its nature.

The elements of the facade were determined by four types of dimensions: those that came directly from the context, those determined by the basic use of the element, those informed by the materials and their processes, and those determined by human scale. The analysis of the facade involved the identification of the following process of generation: 1: the identification of sub-elements and 2: their assemblage to form elements. 3: the aggregation of elements into subsystems, and 4: the position of these in the larger facade-site called system.
The family of elements common to each interpretation served as a continuity (theme) while the different aggregations and assemblages of these elements, the variants, supported the identity and identification of the individual.

Use, body and context dimensions for floor heights determined the supports vertical as well as the position of the elements in the facade. Elements and openings were designed in relation to the width of the support types, which were studied to test their capacity to hold a range of variations in the assemblage and aggregation of both elements and openings. Form elements, openings, and their rules regarding position and dimension were then used to generate the facade systems at the collective level.
ELEMENTS

1. Doors: Arched
2. Window Lintel
3. Windows
4. Door Ojo de Buey
SUB-SYSTEMS

FRENCH WINDOW (A)

BALCONY (B)

SINGLE (GROUND)

SINGLE

EXTENDED

COVERED
capacity of the support façade zone
inhabitation of rooms
openings

NOV 16:1980
Ballaja, the barracks of the Spanish military, is used as a sketch problem exploring a projected generation through movement. The three major goals were 1: to revive Ballaja, allowing it to be part of the city (both in function as well as definition), 2: to liberate its central plaza making it part of the fabric of the city instead of a self-contained space, and 3: to establish a link between El Morro, its grounds, and the rest of the tissue, integrating them as well. The study concentrated in designing a physical framework which would support and reinforce the goals stated above, and serve as a built reference for the future inhabitation and re-use of the building.

The construction of Ballaja was begun in 1854, in attempt to solve the housing problem of the Spanish army. After the Spanish-American war, the Americans used it as barracks, storage, offices, and headquarters. It has been abandoned since the Americans left Fort Brooke (American army base in the grounds of El Morro). Subsequent projects to re-use the building have not been realized. This might have to do with the enormous size of the building (7,716 sq. mts.). It is a rectangular building, three stories tall, with an (also enormous - 2,422 sq. mts.) interior patio in the center.
Using the existing as a reference, the design developed a secondary system to articulate the public movement and to bring down the scale of the building's arcade to more human dimensions. It also opened the southeast corner of the building, making the plaza both visible and accessible.

Part of the fabric of the housing tissue was integrated as a support replacing the compartmentalized cells of the barracks.

Until now the intervention only involved the existing physical definitions and the orthogonal system of the building. However, through movement, the link between El Morro (reinforced by the direction of the promenade leading to it) and the city (Plaza San José representing the most immediate public node) generated a diagonal directional system. This diagonal was reinforced by a new support structure, different from the housing support, which was to hold a larger public function. This new support reduced the size of the patio to more manageable dimensions. The landscape was then introduced as a third continuity reinforcing this new direction and the link between park and city. This diagonal direction first positioned in the northwest corner was then shifted to the right to coincide in a node at the end of the existing arcade. This node where the two directions - the existing orthogonal and the new diagonal - meet, holds the major services, vertical circulation (stairs and elevators), as well as the connection to the projected housing fabric.
The projection at the collective size was generated through movement as related to the intentions at the level of the tissue as well as from the making of collective places through the aggregation of support structures. The study involving Ballajá was integrated at this level not as an isolated object but as a physical definition reinforcing the general intentions.

The collective size involved the manipulation of three major continuities: landscape, movement (access) and building. The design took a linear character as a result of the narrow dimensions of the site and as a response to the intention of continuing the north-south pedestrian link. This pedestrian street is, however, a collection of places. It ends in a larger collective place at which point the site opens to El Morro and the sea, and the pedestrian network joins the entrance promenade leading to the fort. What follows is a series of drawings showing the development of the site at the collective level.
The work is not law, it is above the law.
As projection, as phenomenon
it is forever starting.

Klee
Perhaps if we can lift the quality of our own work, we can learn to be at ease with a greater part of the entire time/place spectrum of the built world without inappropriate plagiarizing or sardonic dissecting from mock-theatrical reassemblages. We can find principles that make sense wherever in the continuity of whenever; we do not need historical time divisions. We're not concerned with pedigrees or authorships, but with live associations which are field-like and lateral rather than linear in perspective.

Maurice Smith

This thesis is by no means a complete development of a housing project. As a directed exposition of a method, working process, and design attitude, like support and physical frameworks, it becomes a reference for further study and work. As a design generation, it presents what I hope will be an initial step toward a positive and responsive alternative for the specific site and context studied.

Design projections, if intended to work with, from, and not against the context at hand, will have to be based on the very nature of the context (structure and relationships), and not on sheer mimicking in the name of 'contextualism' (especially in historically sensitive contexts such as San Juan).

FOURTH INTRODUCTION
As time changes, needs conditions and realities change. Built environments as physical expressions of these realities must not be statically complete givens, but rather directed settings for the associations, collective and individual, of society.

If we have learned anything over the past years it is that buildings can no longer be thought of as static monuments. They must be responsive to the different and changing needs of people. We must design highly articulated physical frameworks that can provide a reference for growth, change and dreams. What we do then is not the end but an exciting beginning.

Jan Wampler
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<th>Definition</th>
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<tr>
<td>ADJACENCY</td>
<td>tangential organization. non-reciprocal</td>
</tr>
<tr>
<td>ASSOCIATION</td>
<td>meaning. interpretation of form.</td>
</tr>
<tr>
<td>BUILT</td>
<td>process of the generation of form. construction.</td>
</tr>
<tr>
<td>BUILT LIGHT</td>
<td>light generated through a single opening in a continuous surface context.</td>
</tr>
<tr>
<td>COLLAGE</td>
<td>simultaneous experience. layering. integration of elements.</td>
</tr>
<tr>
<td>CONTAINMENT</td>
<td>partial or complete enclosure.</td>
</tr>
<tr>
<td>CONTINUITY</td>
<td>relational response involving extension.</td>
</tr>
<tr>
<td>CONTINUOUS SURFACE</td>
<td>of the single or double-sided family of form whose property is that of continuous extension of material (eg. concrete)</td>
</tr>
<tr>
<td>DICHOTOMY LIMITS</td>
<td>polar opposites in a range of transformations.</td>
</tr>
<tr>
<td>FIELD</td>
<td>context. medium in which certain forces act.</td>
</tr>
<tr>
<td>FIT</td>
<td>pre-made element. standardly produced element.</td>
</tr>
<tr>
<td>FRAMEWORK</td>
<td>of the three-dimensional linear family of form (frames, columns and lintels, steel, wood). an incomplete physical reference which serves as a site or context for a future intervention.</td>
</tr>
<tr>
<td>IDENTITY</td>
<td>character of form.</td>
</tr>
<tr>
<td>PROJECTION</td>
<td>intervention, design.</td>
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<tr>
<td>RECIPROCITY</td>
<td>mutuality. mutual definition between and among elements, spaces, and movement. interpenetration, interlocking.</td>
</tr>
<tr>
<td>REGISTRATION</td>
<td>comparative movement. every decision is made relative to an existing physical reference.</td>
</tr>
<tr>
<td>SCREEN</td>
<td>planar framework. filter of light.</td>
</tr>
<tr>
<td>SCREENED LIGHT</td>
<td>light generated through a linear framework or a screen.</td>
</tr>
<tr>
<td>SLACK</td>
<td>dimensional tolerance. dimensional resultant of a series of decisions involving 'fit' elements, or from a passing connection. hand-made (crafted) element to infill such tolerances.</td>
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<tr>
<td>SPATIAL JUNCTION</td>
<td>passing of elements in an assemblage process, with a dimension or territory as a result of the exchange.</td>
</tr>
<tr>
<td>STRUCTURE</td>
<td>formal set of properties in a system of relationships.</td>
</tr>
<tr>
<td>SUBDIVISION</td>
<td>separation. compartmentalization. segregation.</td>
</tr>
<tr>
<td>SUPPORT</td>
<td>physical reference for future intervention at the level of the building.</td>
</tr>
<tr>
<td>TERRACING</td>
<td>displacement of horizontal surfaces.</td>
</tr>
<tr>
<td>TERRITORY</td>
<td>unbuilt physical definition. place.</td>
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<tr>
<td>TISSUE</td>
<td>level of intervention smaller than that of the urban structure and larger than the individual building. collective level.</td>
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<td>USE</td>
<td>interaction between man and form. activities.</td>
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150: Callejón de La Capilla
   Steps, Yauco
151: San Juan
155: Aerial View, Islet (Cruv)
160: Aerial View, Islet (Cruv)
161: Aerial View, Islet (Cruv)
163: Site (Gómez)
165: Site (Gómez)
166: Plan (Rodríguez)
170: Zaguán, San Juan (Cruv)
171: Zaguán, San Juan (Cruv)
173: San Juan
    Habana (Guarnini)
174: Patio, Casa del Callejon (Diana)
175: Collective Patio, Cruz St. (Cruv)
203: San Sebastián # 106 (Gómez)
    San Sebastián # 100 (Gómez)
    Calle Sol
    Callejón del Hospital # 56 (Gómez)
207: Callejón del Hospital # 60 (Gómez)
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