

The **original print** of the book

Of Surface and Shadow

by

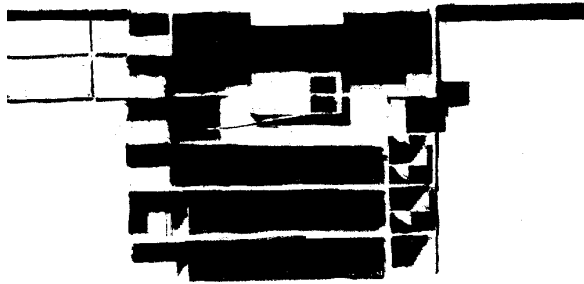
Clarissa Mendez

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Of surface & shadow:

Proposal for a New School of Architecture at the University of Puerto Rico



Thesis submitted to the Faculty of the Virginia Polytechnic Institute & State University in partial fulfillment of the requirements for the degree of Master of Architecture approved:

Pia Sarpaneva

committee chair

Heinrich Schnödt

Frank Weiner

Michael O'Brien

I dedicate my work with tremendous love and appreciation to my mother and my father.

I express sincere gratitude to **Pia Sarpaneva** and **Heiner Schnoedt** for their academic support throughout my graduate studies.,
And to Frank Weiner and Mike O'Brien for their dedication to the project as members of my committee.
Thanks to my family and good friends who have been an important part of the process..

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line

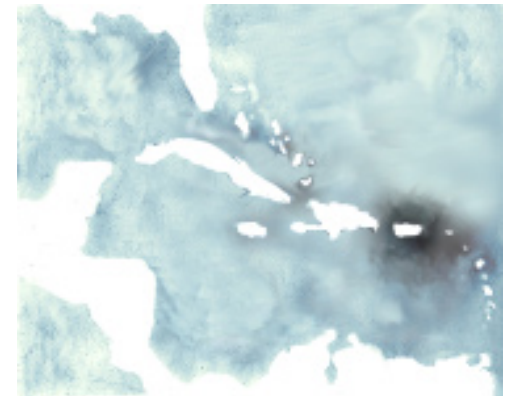
shadow

surface

mass

Background

Puerto Rico is a link in the chain of islands, the Antilles, which it divides in two. The chains west end is Cuba, followed by Jamaica and the island of Hispaniola, shared by Haiti and the Dominican Republic; then Puerto Rico. Next, the Antilles curve southward through the Leeward and Windward Islands until they end with Trinidad, which is off the Venezuelan coast. Puerto Rico's prevailing winds come from the north, giving this shore most of the rainfall. A spine of mountains follows Puerto Rico's long axis, which runs for a hundred miles, from west to east. On the south the strain of vegetation is tawny from drought, but in the north it is tropical green. It is always balmy in Puerto Rico, seldom does it feel very hot although the temperature is never below 60. Because of this, the enclosure of the man-made environment allows for a convergence between interior and exterior space.



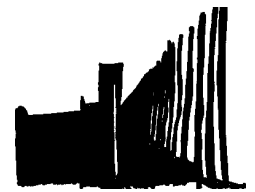
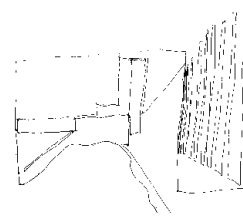
Objective

Puerto Rico is a place of strong sunlight, temperate winds and humid climate. It is also a place where the landscape and the natives are very colorful. Today's culture consists of a chaotic urban atmosphere which tends to obscure an extraordinary geography and the natural richness of its surroundings.

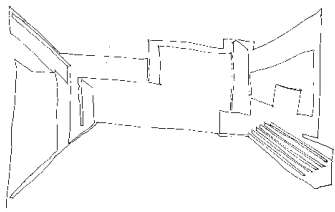
As in any Western metropolitan area, urban life demands its toll. San Juan is plagued by noise, and heat intensifies between its buildings. Modern air-conditioning is by now a part of every work place and many residences, but beyond mechanical technology, architecture still can offer generously places of shade and shelter from the sun's rays.

This project studies the essential characteristics of the landscape and climate of Puerto Rico, and aims to expose these architecturally. The rediscovery of these conditions is articulated by studying the compositional qualities of mass, surface and shadow.





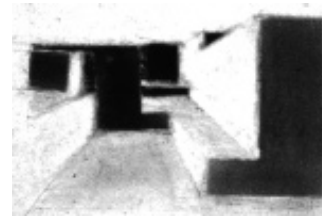
l i n e makes **s h a d o w**
 line as surface shadow as mass
s u r f a c e makes **m a s s**



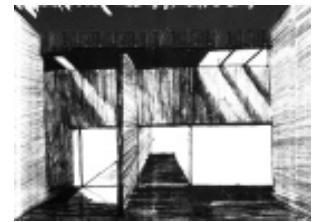
surface as line



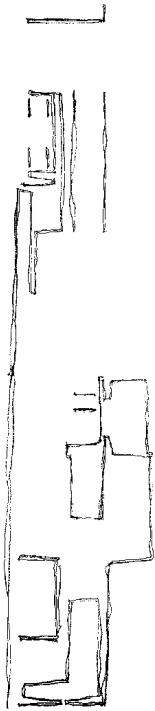
shadow as mass



surface, shadow and mass



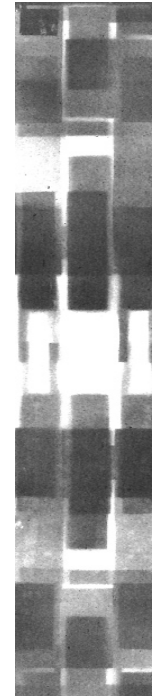
layers



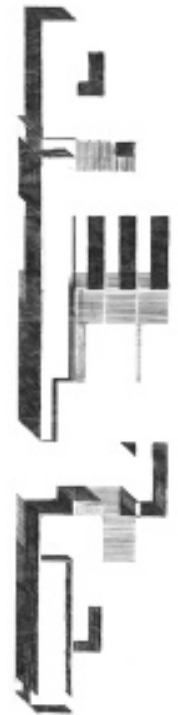
The profile of material surface seen as a continuous boundary between mass and void.



The surface of the built seen in its entirety as a figure-ground composition.



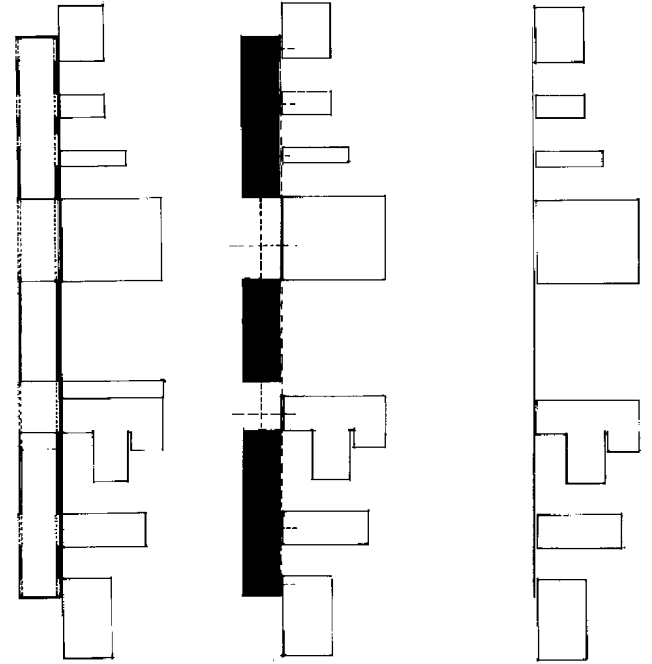
The built seen as a strata of surface that overlap to make a whole.



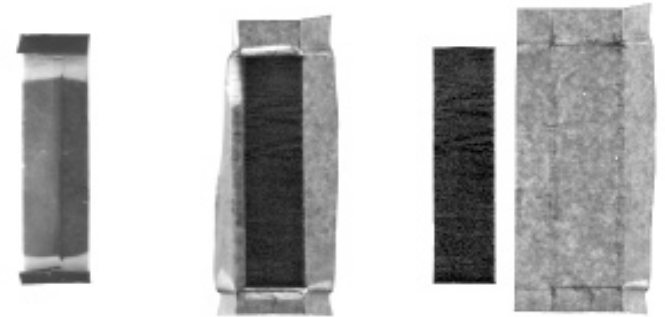
The built seen as an integration of light and shadow.

"Intuition is your most exacting sense, it is your most reliable sense. Intuition stems from the inspiration to live".

Louis Kahn



The act of removing the surface from the mass allows for additional layers, which make an inhabitable intermediate condition.



detaching

as a method of studying the relationship between surface and mass

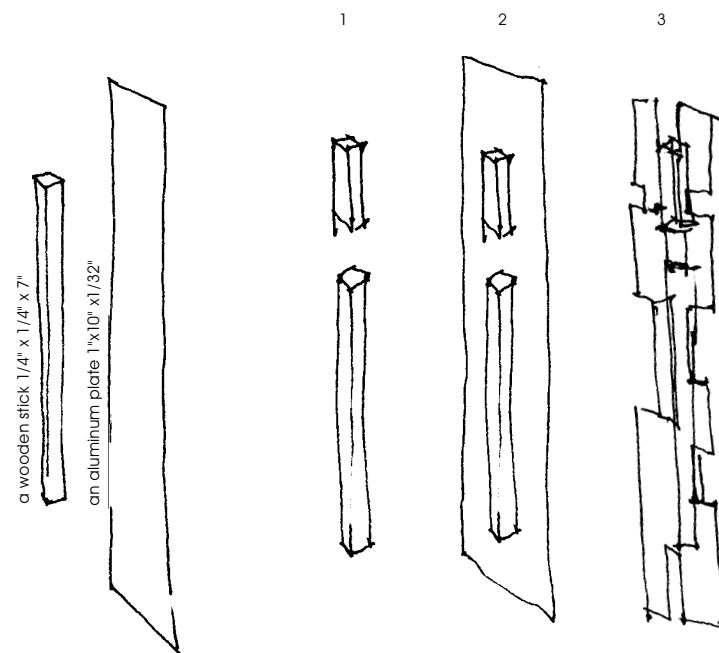
In Christo's Wrapping of the Reichstag he adds a layer of fabric to the surface of the building securing it with ropes. The fabric wraps around the entire outer layer of the building following its contour and covering the openings. The rope is placed in such a way that it emphasizes reliefs. As a result the building is perceived as a solid block of mass.



attaching

as a method of studying the relationship between surface and mass

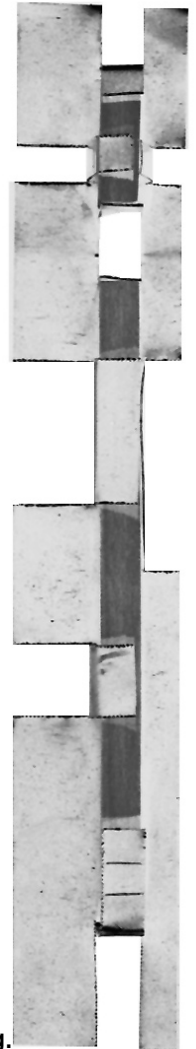
Take something that is one, cut it in half and make it one again.



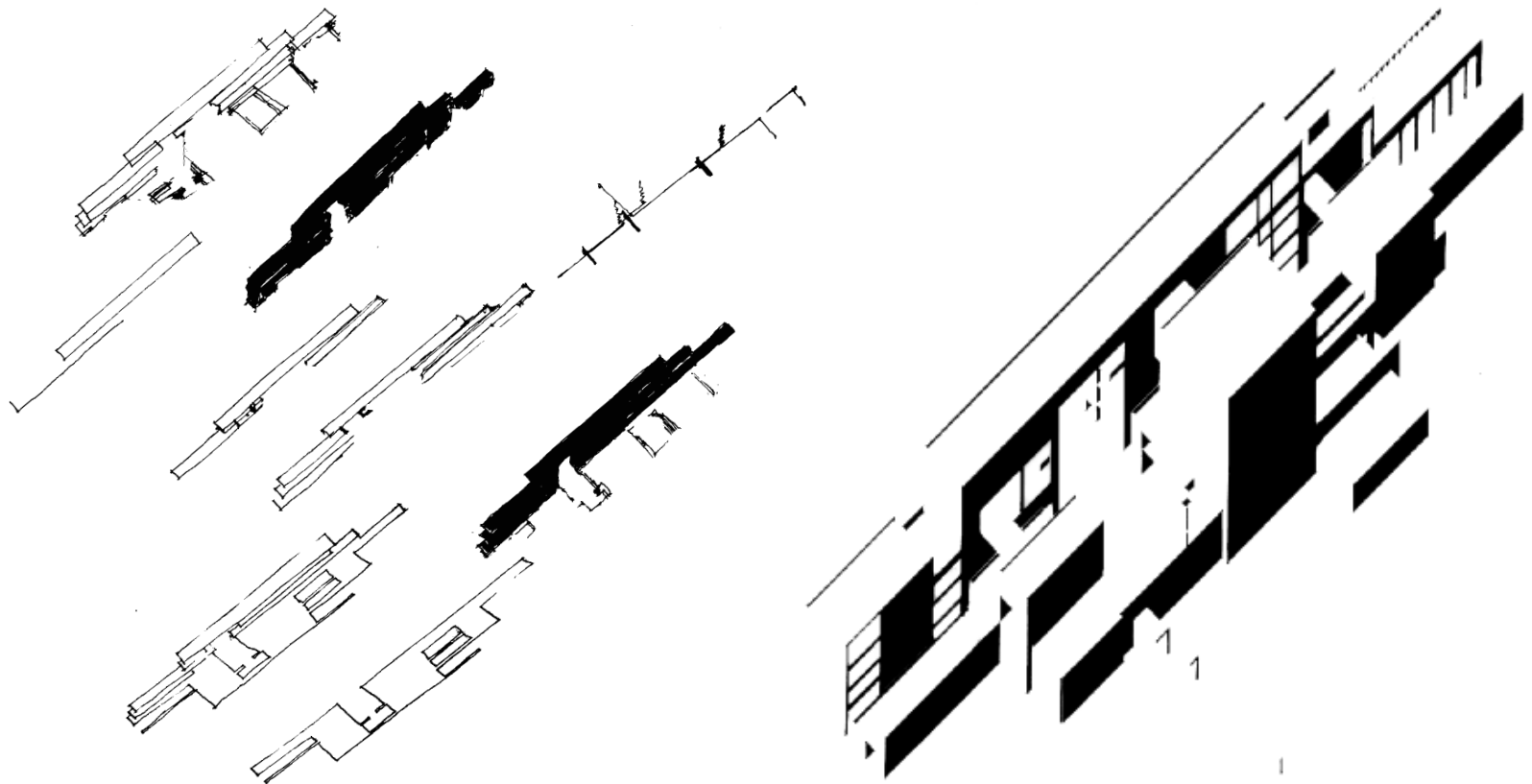
1 **Cut** the stick at 1" from one of its end points.

2 **Overlay** the two pieces on top of the metal with a separation of 1/2" between them and place them at 1/4" of the right side and 1" of the top edge.

3 **Join** these two pieces by cutting parts of the periphery of the plate and folding them in to wrap around the stick's surface.



A conceptual exercise: studying the idea of **disjoining** & **interlocking**.



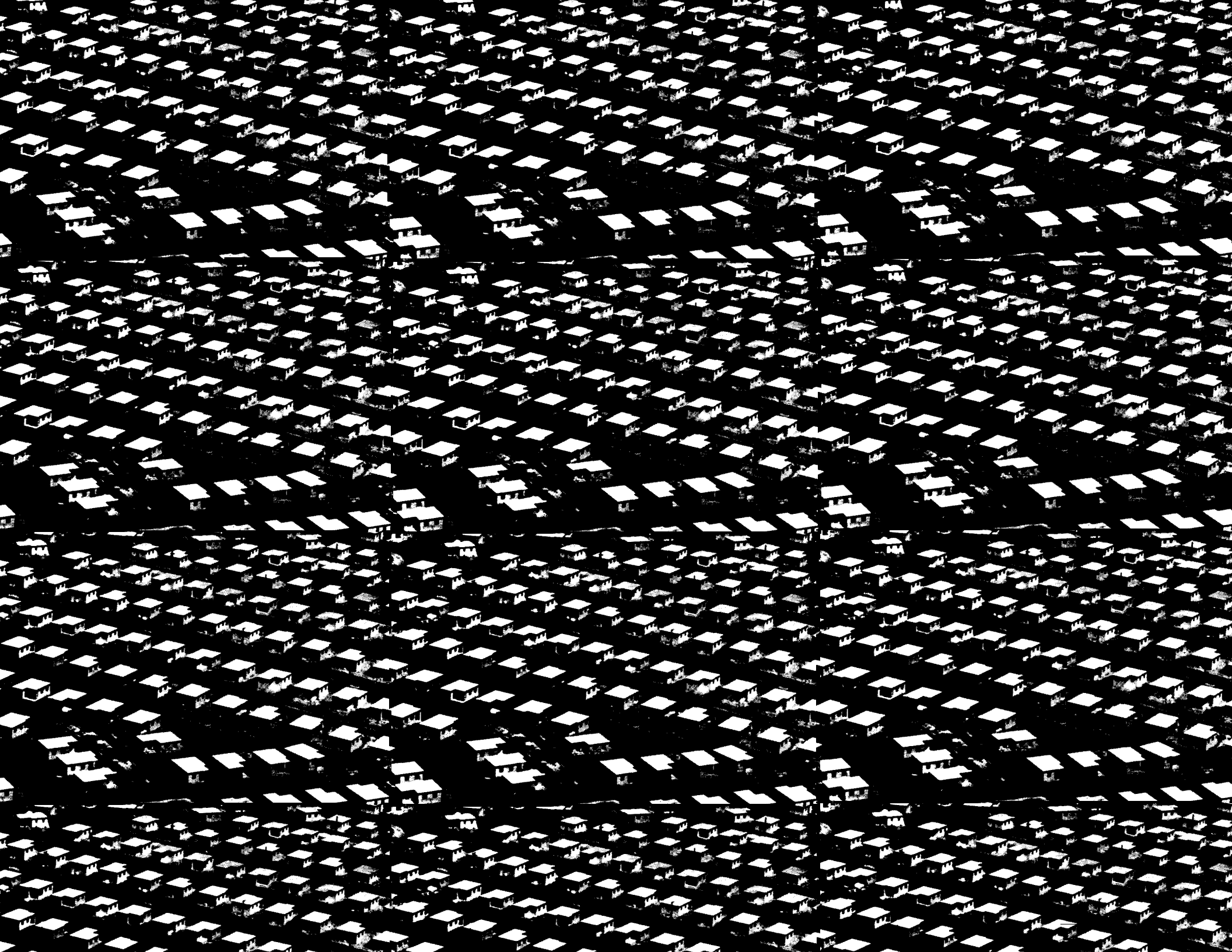
In this project the enclosure is a composition of parallel planes of an opaque material. The size of the surfaces vary proportionally creating an interrelationship between them. The perforations that cut through this strata of walls expose the range of the enclosing surface.

"The surface of the temple or the factory is in most cases a wall with holes for doors and windows, these holes are often the distinction of form; they must be made by **accentuation of forms**".

Le Corbusier, Towards a New Architecture

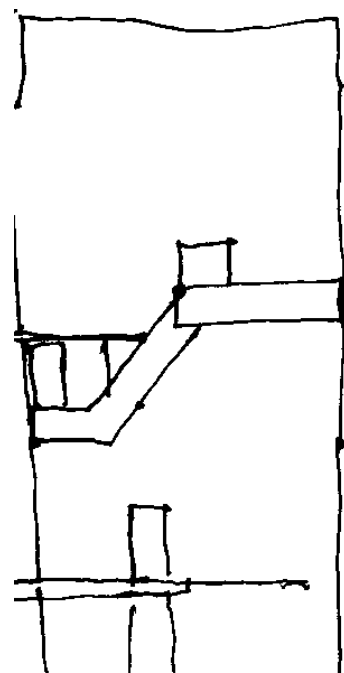
enclosure:

is where the relationship between surface and mass occurs





l i g h t :



reveals the depth of a line



The University of Puerto Rico was established in the year 1930. The style of the design of the master plan is Spanish Revival. Originally, it was not only selected because it was fashionable, but also because it represented the Hispanic heritage of this cross-culture. During the decades of 1940-60, the economy of Puerto Rico suffered many changes. The physical development of the campus was directly affected by unstable funding and inconsistent administration. However, by considering the climate, the people, the construction methods and the resources available, the new master plan for the campus became affordable. Designed by architect Henry Klumb, this master plan was built in the early 50's. His buildings show how shadows give depth to the surface by creating a three-dimensional pattern in the enclosure.



The Women's Dormitory designed by architect Henry Klumb

p a t t e r n

o f e n c l o s u r e

At Taliesin Henry Klumb worked with several drawings as head draftsman for the Taliesin fellowship. In some of Klumb's letters to Frank Lloyd Wright, Klumb mentions about the importance of his experience. Klumb's unique rendering technique of contrasting shadows significantly differed from Wright's strokes. He was quite sensitive in emphasizing the way light and shadows fall upon (Wright's) buildings. Klumb states, "the buildings may come and go but the drawings stay". In one letter to Edgar Tafel, Klumb explained the kinds of drawings drawn for Wright's "Princeton Lectures". He suggested that they be interpreted. He writes:

"Assembled and sitting with Frank Lloyd Wright around a fire and in the studio one winter day in 1929, discussing this and other matters of "organic architecture", I suggested that we might try to reduce his delicate renderings of his best known buildings to two-dimensional black on white graphic presentations that modern architects were addicted to. His answer: "do it". Okami and I went to work and produced several, including the Robie House (drawn by myself), the Winslow House, Yahara Boat Club, Bock Atelier, Unity Temple, and the Larkin Building. All were drawn in ink on roll-up window shades. The result was that even the stark graphic black on white surface presentation did not produce a two dimensional effect rather they emphasized the depth of his poetry and the power of the third dimension. Nothing that International architecture had to show could equal it".¹

"Klumb thought the stark graphic black on white presentations emphasized the depth of Wright's poetry and the former on the third dimension".²

By studying these drawings his explanation becomes clearly a simple drawing developed by contrast of shadows of black and white compositions. As mentioned earlier the black ink on white paper differs strongly from the delicate and detailed renderings that characterized Wright. An interesting association comes out between this accomplishment and the images of Henry Klumb's Buildings. These strong images describe how the shadows over a simple and smooth surface give out the third dimension of the enclosure.



d e p t h :

stark

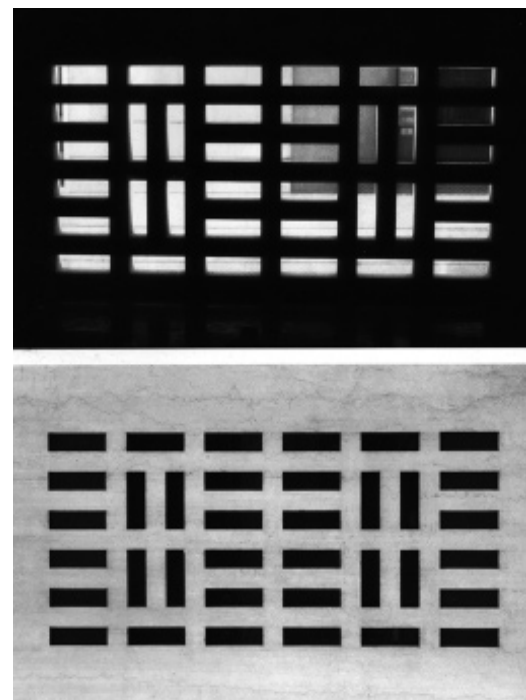
graphic

black

on

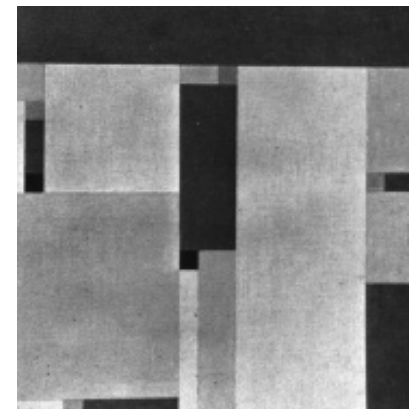
white

Voids become solids when the surface blocks the sunlight. The example selected to illustrate this condition is a grill on the Banca Popolare di Verona, by architect Carlo Scarpa. When viewed from the exterior the openings on the surface appear to be an added pattern on the marble. Solids and voids become one in the skin. The pattern is only perceived as openings when seen from the interior. This brings an opportunity for a continuity of space from the inside to the outside, as well as from room to room.

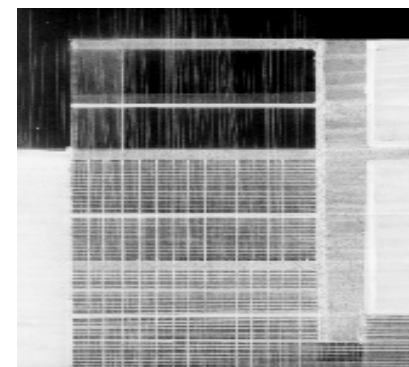


solids and voids, merge on the outside

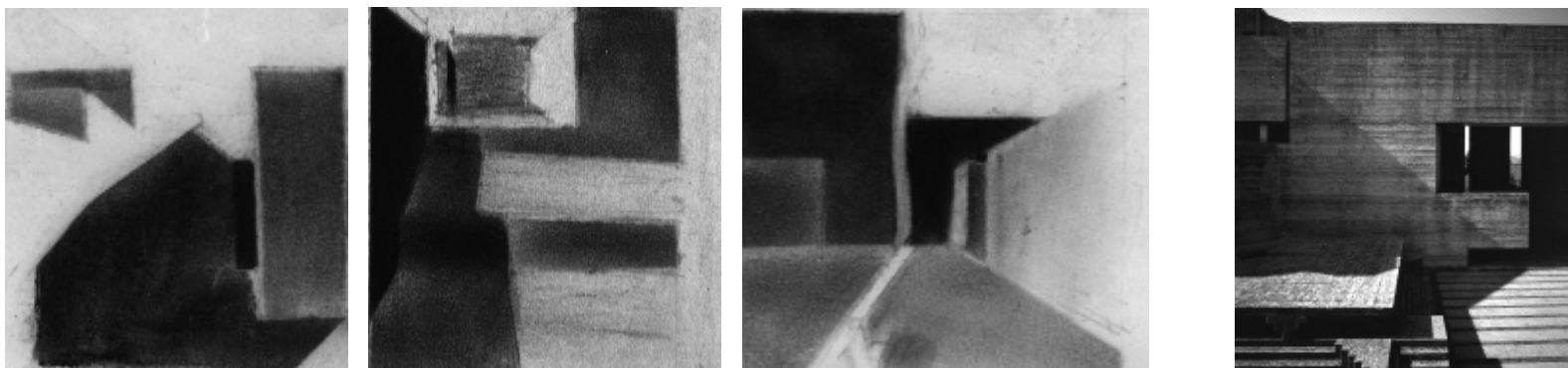
In Max Bill's paintings the layered surfaces of planes can be seen as mass.



In this project the overlaying of the landscape, the walls and the enclosure creates a density and an opacity that permits a reading of these layers as one massive structure.



m a s s : o v e r l a y i n g o f s u r f a c e



Early diagrams of the project showing a sequence through the first study model.

"SURFACE : The architectural complement that best lends itself to exploiting light, to enhancing the vital function of color, creating either strong or gentle contrasts. Closer than other spatial components to painting, every style and every epoch has conjured it. In our case it inevitably becomes a very versatile means of expression."

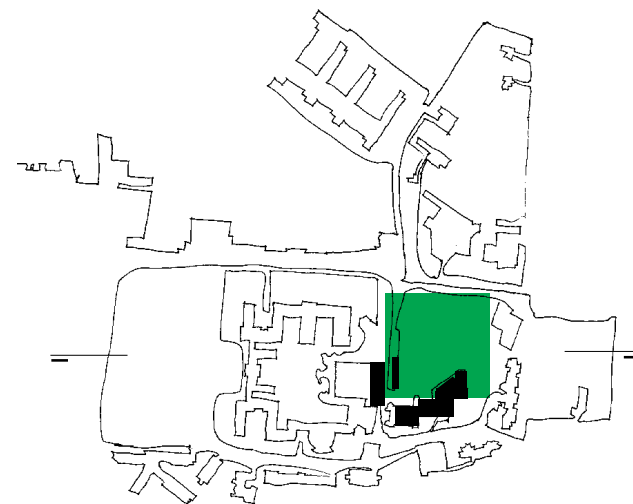
Sandro Bagnoli, Carlo Scarpa: Achitecture in detail.

s u r f a c e as a means of e x p r e s s i o n

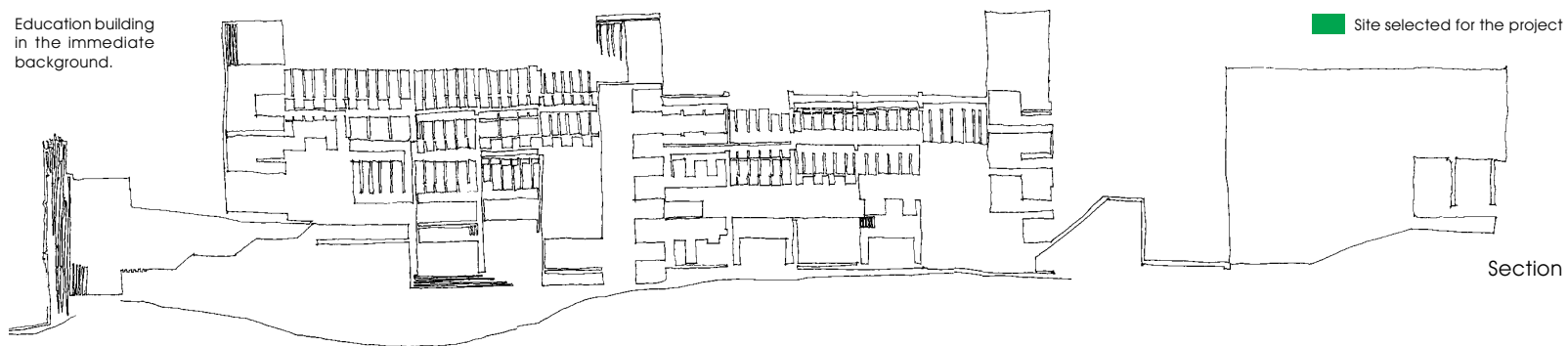
The surface of the built environment in Puerto Rico forms an enveloping fabric that encloses a diverse and dynamic culture. In buildings which respect the climate life takes place against the background of shade and overhangs. In the old settlements, white buildings compose the backdrops of plazas filled with green trees. These urban rooms become the stage for the daily interaction between the people. Further inland, like shelves of concrete, lie the suburbs. Typically constructed of bare wall and floors, the furniture strongly articulated takes on the role of forming "home". Beyond the suburbs and the roadside, the old tropical landscape finally takes over.



s h a d e



Campus plan



Education building
in the immediate
background.

Site selected for the project

Section

l i n e : the surface of site



m a s s :

the surface of site



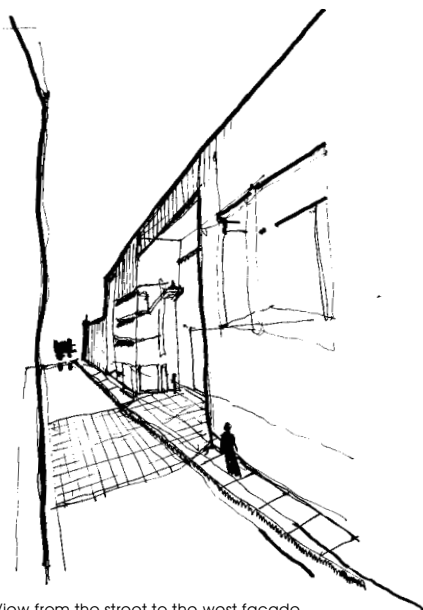
The smooth, uniform texture of the white skin proposed for the new building will quietly oppose the vivid color and strong ornamentation of the existing facades of the University Square. This gesture, although in opposition, intends to enhance through contrast the existing condition of color and articulation.



The surface of the Tower at the University Square, U.P.R.

b u i l d i n g :

complementing the **existing**

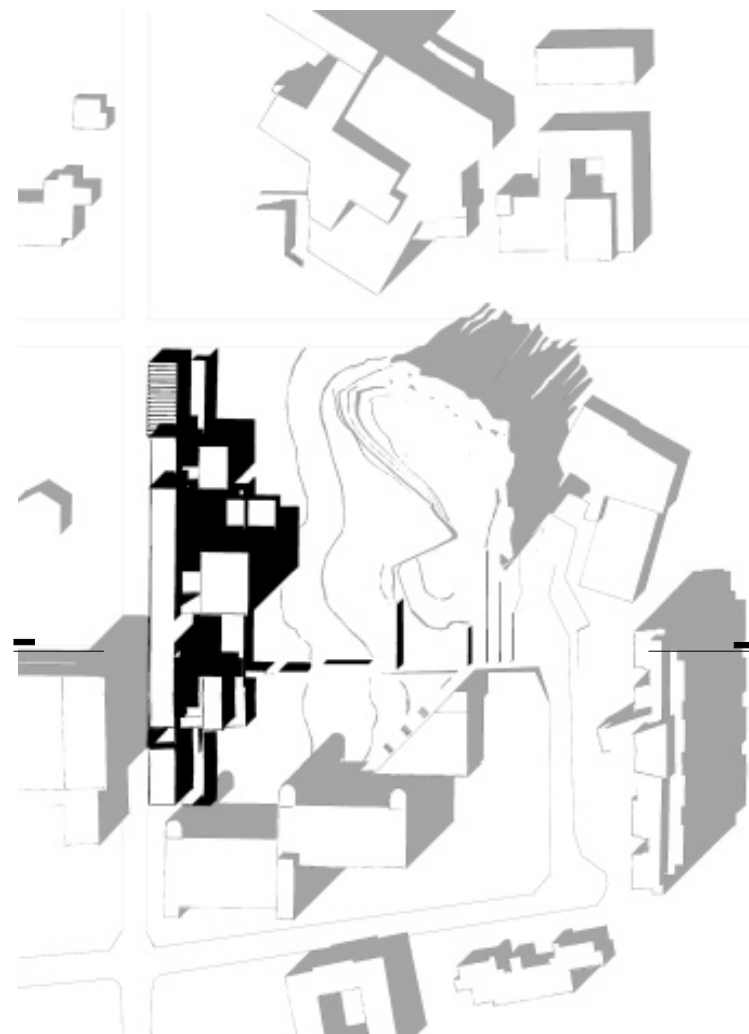


View from the street to the west facade.

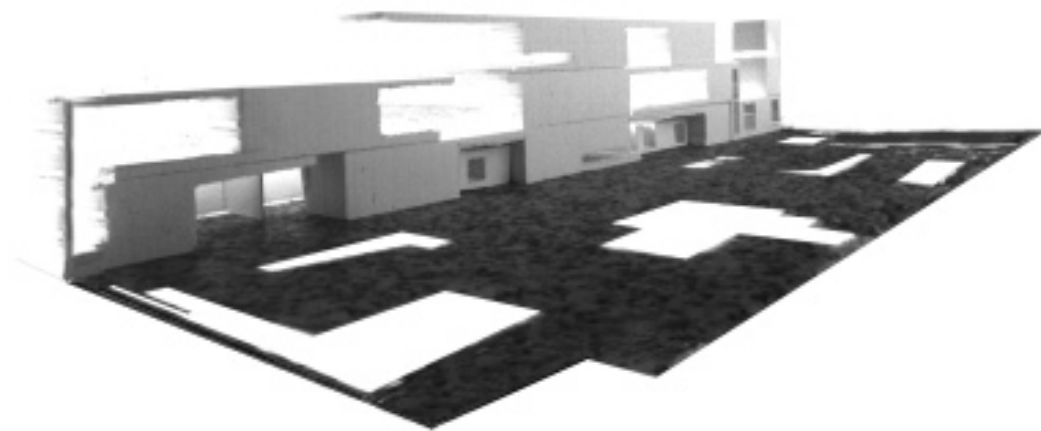


As the shadows slowly spread across the ground and building's surfaces, the sensation of an interior is perceived on the site separated from an exterior (the street).

"The sun never knew how wonderful it was until it fell on the wall of a building"
Louis Kahn



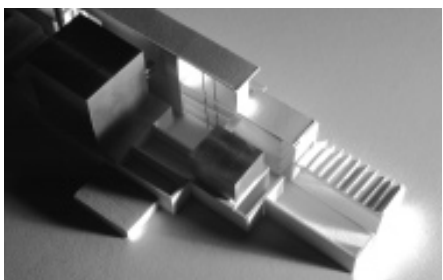
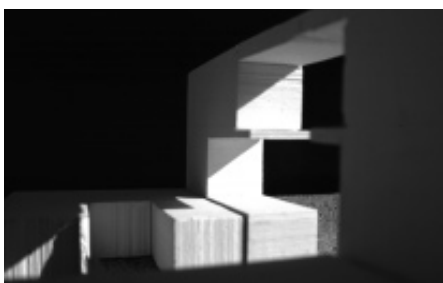
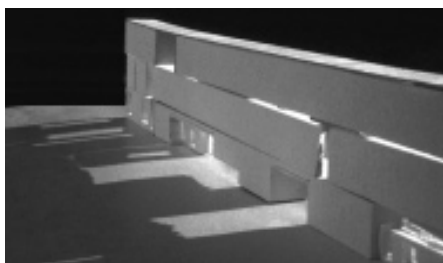
Site Plan illustrating the shadows of the buildings projected on the site.



The shadow generates an interaction between the surface and the ground, it also serves as a designator of the program.

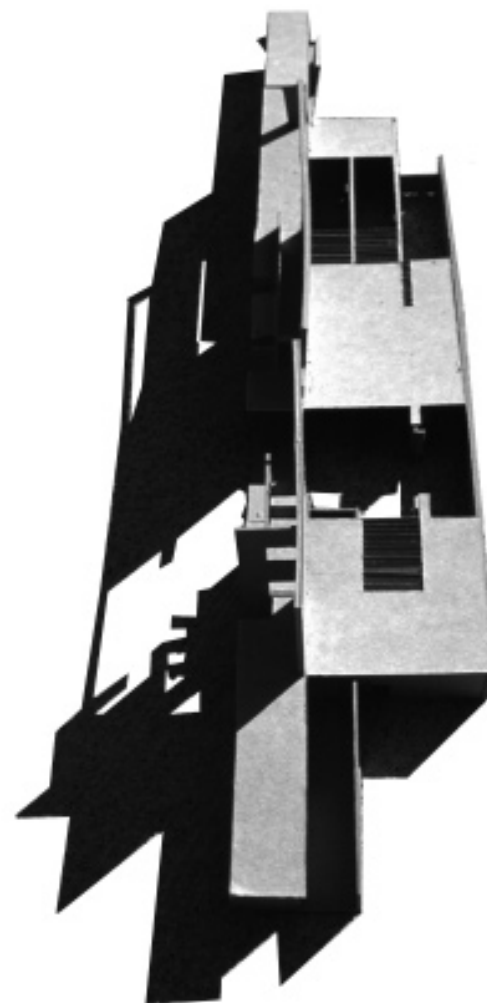
s h a d o w s :

the third dimension

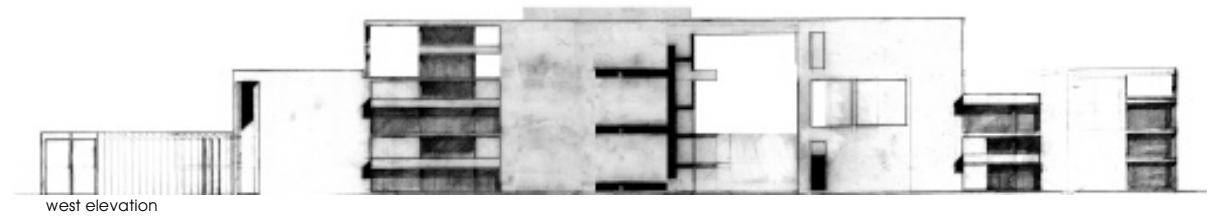
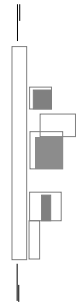


...observe the play of shadows,
learn the game... Precise shadows,
clean cut or dissolving. Projected
shadows, sharp. Projected shadows,
precisely delineated, but with what
enchanted arabesques and frets.
Counterpoint and fugue. Great music.
Try to look at the pictures upside down.
You will soon discover the game...

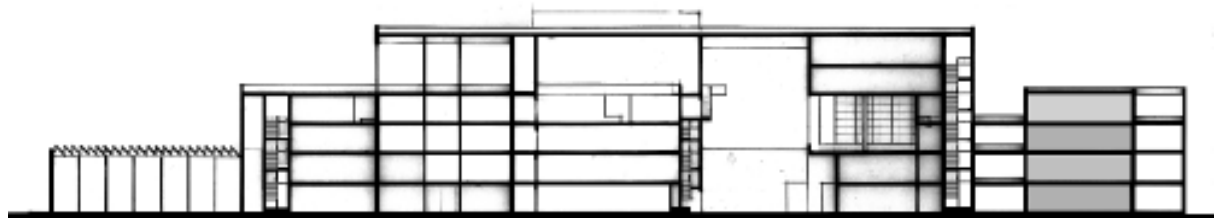
Le Corbusier



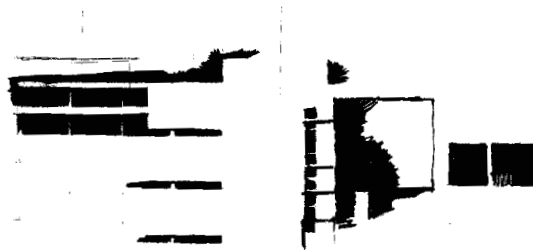
...l c o m p o s e w i t h l i g h t ... **Le Corbusier**



west elevation



section through the wall



On the island of Puerto Rico, much of life takes place outside and the people desire places of shade. To accomodate this need, surface is used as a means of constructing shadows, and shadows are used as a means of defining rooms.

shadows:

make

tangible

what

is

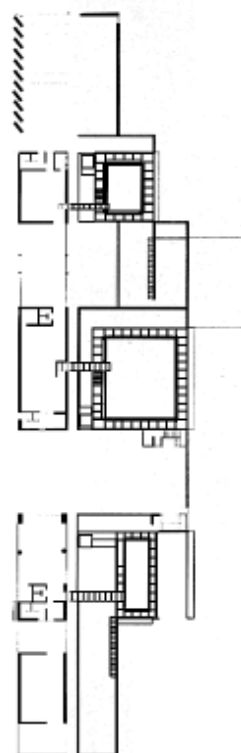
intangible



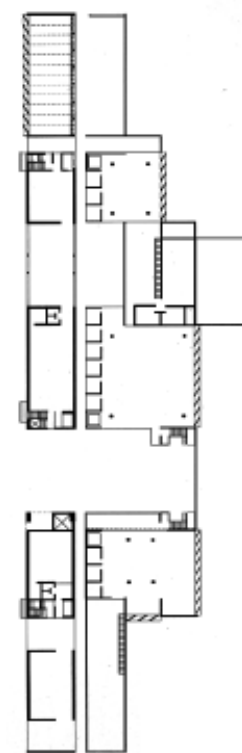
the w a l l the b o x e s the g r o u n d



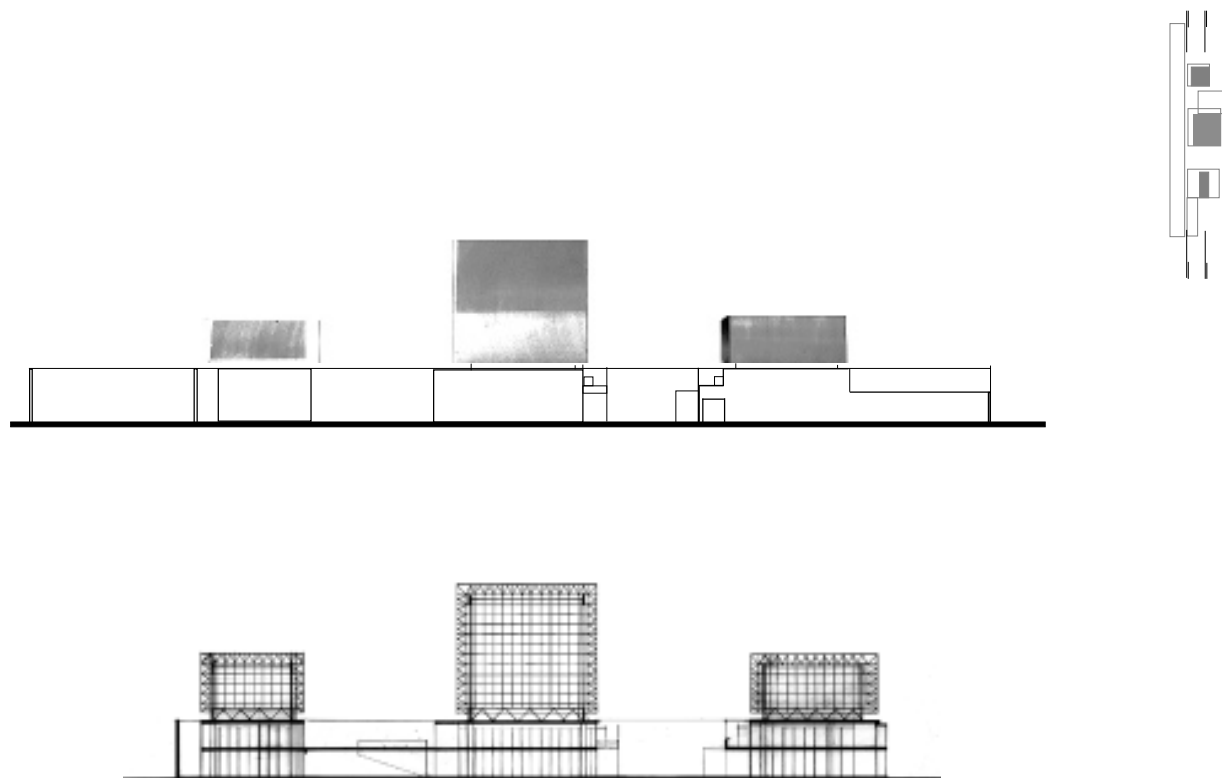
At the scale of campus this wall defines the building as a room. This wall is for **r e s e a r c h**



The aluminum boxes are the exception to the whole in terms of material and composition. These boxes are for **m e e t i n g.**



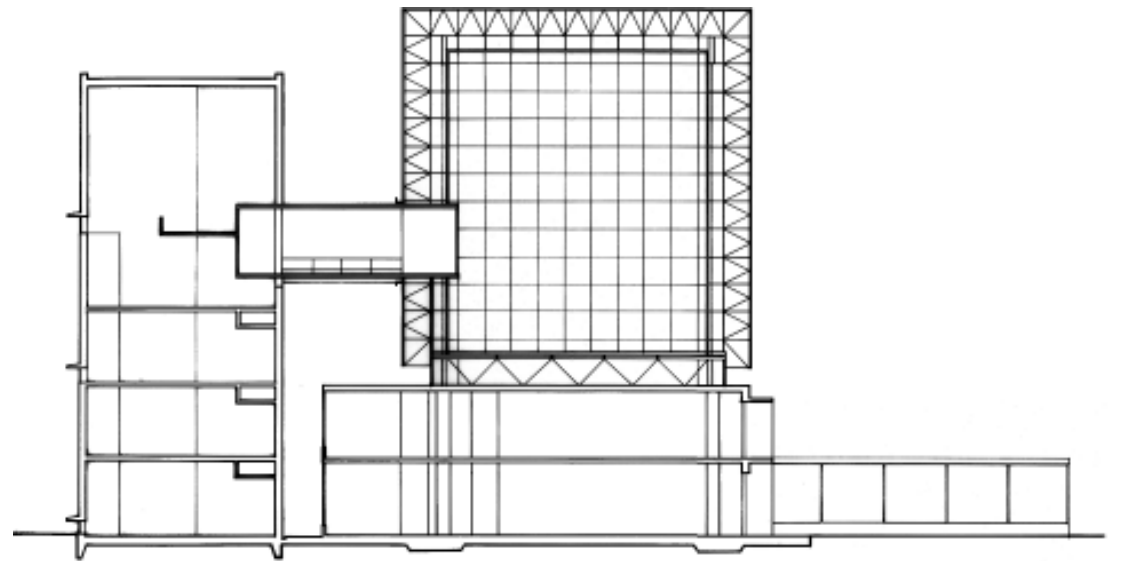
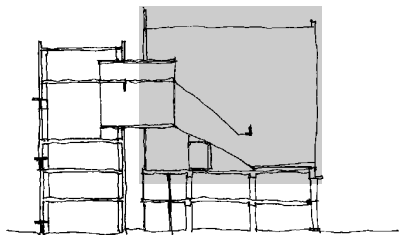
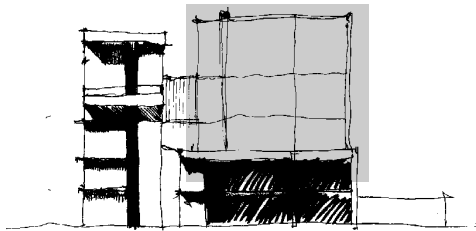
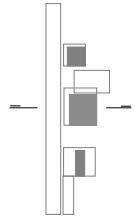
The sunlight creates drastic contrasts on the ground's surface. The ground areas are for design **s t u d i o s.**



The surface of the boxes is of anodized aluminum polished panels 4'x8' panels mounted onto an alloyed aluminum space frame. The interior layer is a thin surface of light colored wood panels.

dual materiality:

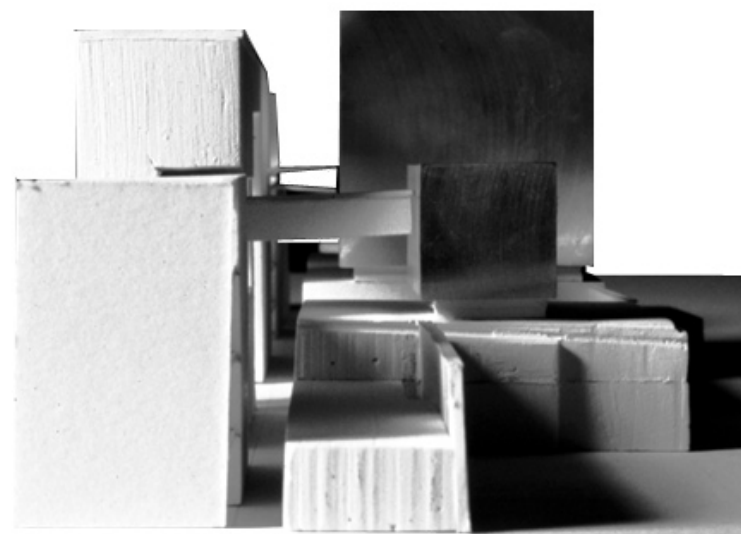
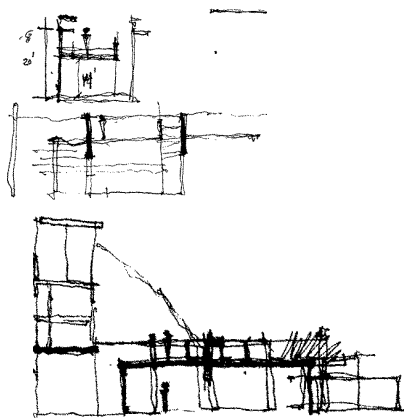
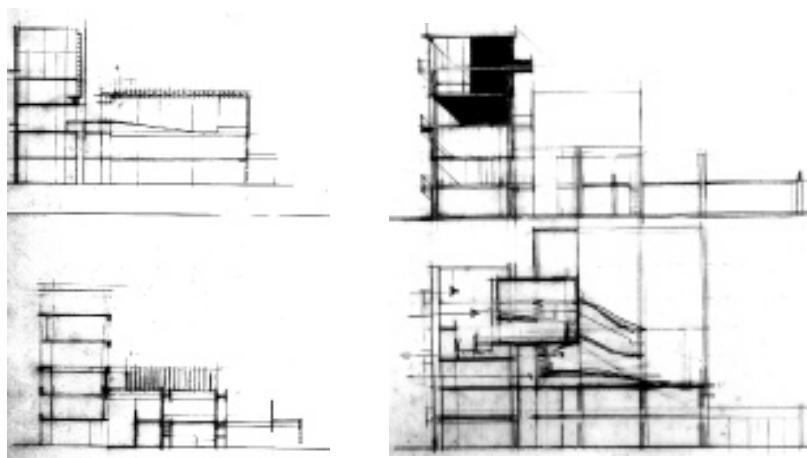
a clean box of metal and wood

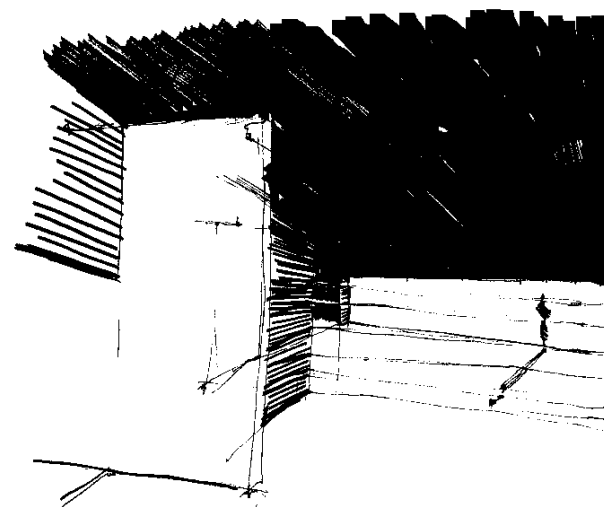
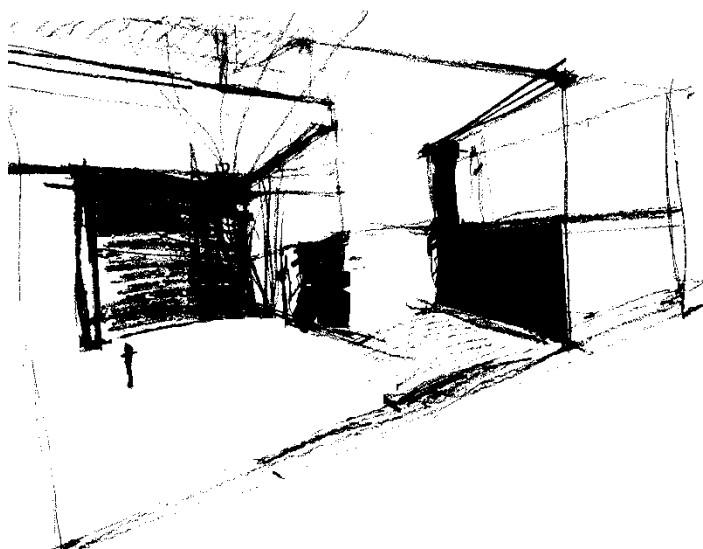


section 1" : 30'

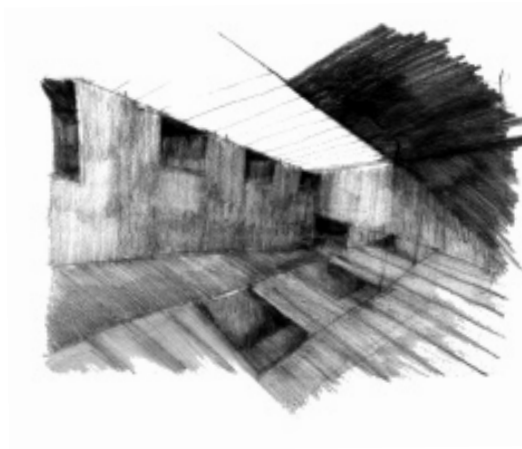
1 10 20

the wall and the ground meet with the boxes





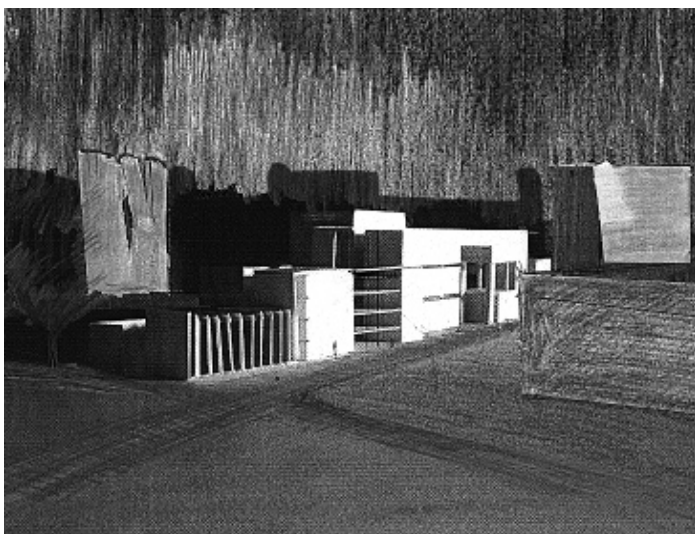
A line of continuity created by the assemblage of the pieces is a consequence of the overlapping of surface and the interlocking of mass. This material enclosure is completed by the effect of light creating immaterial walls of sunlight and shadow. As a result, surface as the topmost layer of things, reveals the continuity of space in architecture.



The process and the result is an exploration in the use of surface and shadows. The manipulation of dark and light areas is created through the manipulation of the enclosure, an enclosure made of one folding surface that envelopes space and becomes three dimensional.



At the scale of the University the new intervention marks a division between the original and the later buildings on campus. The location of the site is approximately the geographic center of the campus grounds. It is surrounded by buildings that were constructed at different decades. To the east a small building formerly used for the School of Architecture, and next to it is the Women's Dormitory both designed by Henry Klumb. To the south is the Education Department built in 1978 and to the west the University Square designed in 1930.



View of the north-west corner

A visual experience between openings and enclosures highlights the immediate context. The openings go all the way through the stack of walls framing selected objects on the site. There are enough apertures to enable a degree of transparency to the building. This way the building itself has its own limits but it also engages the limits of the surroundings.

The largest break on the core is framing the final point of the main pedestrian path on campus. This act forms an entrance into the building and it gives a window to the campus. As a result a continuity is obtained through the visual contact with the background as well as an uninterrupted movement through space.



"Windows are **essential** to school"

Louis Kahn

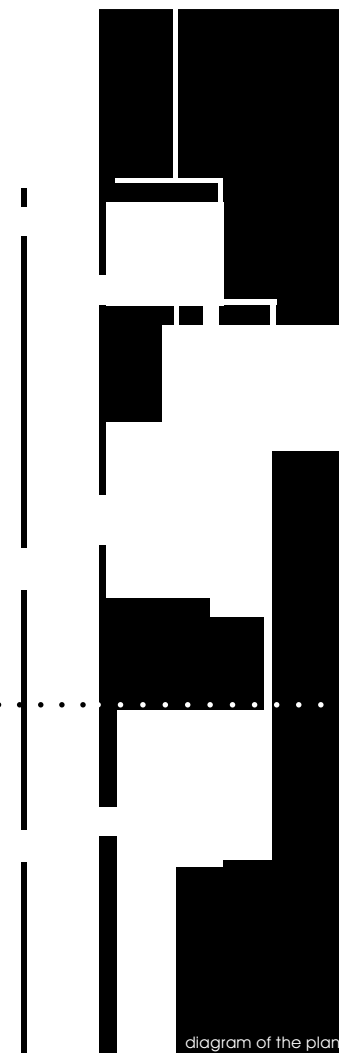
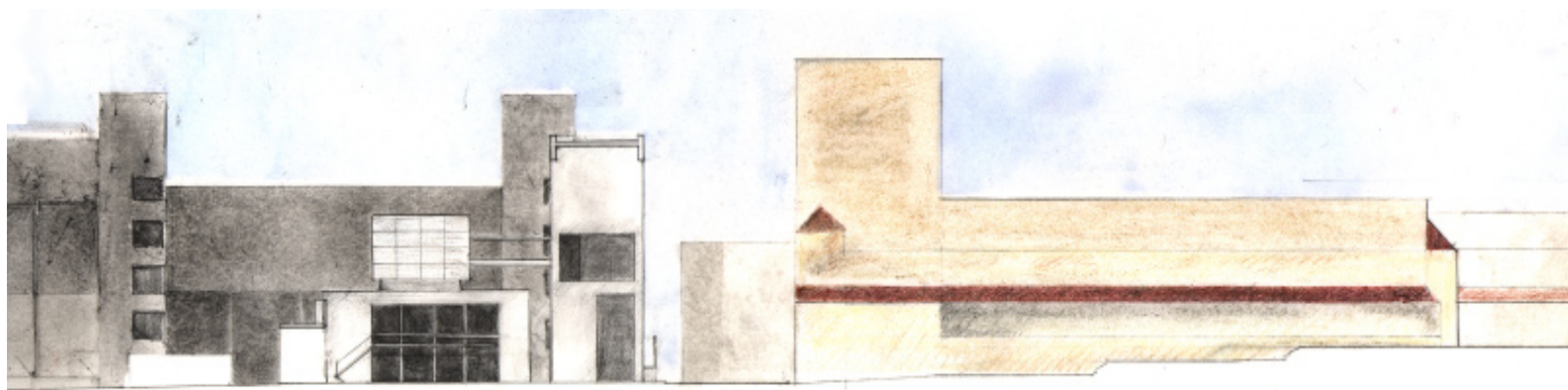
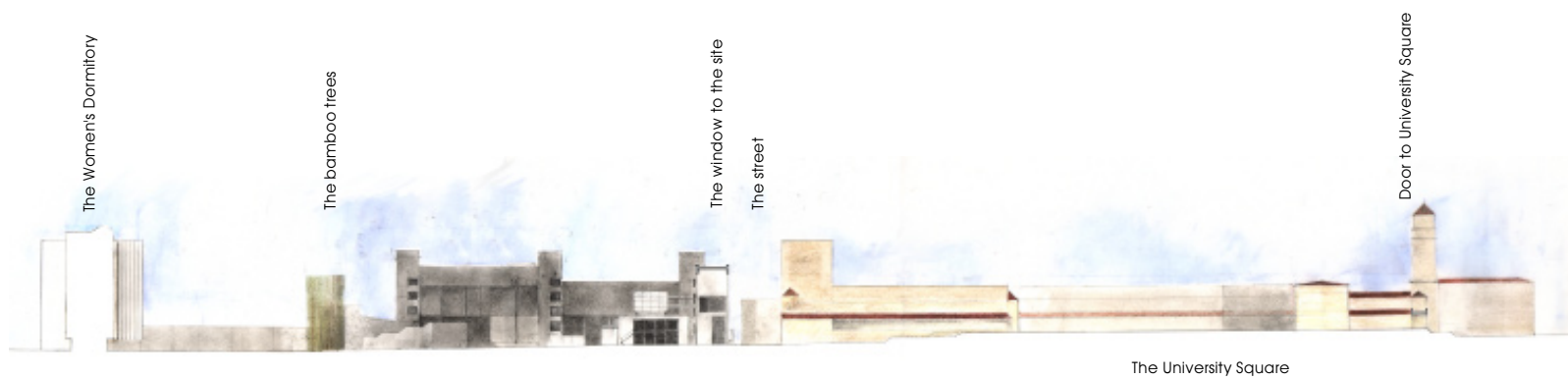
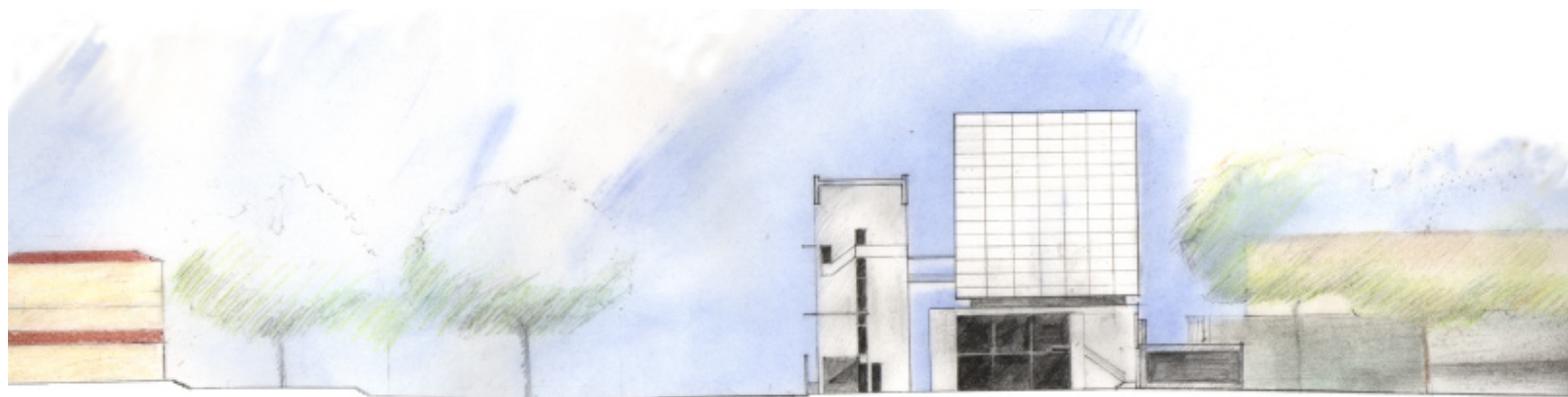


diagram of the plan



New building for the School of Architecture

A section across campus through the pedestrian path. North Side.



New building for the School of Architecture

A section across campus through the pedestrian path. South Side.



1

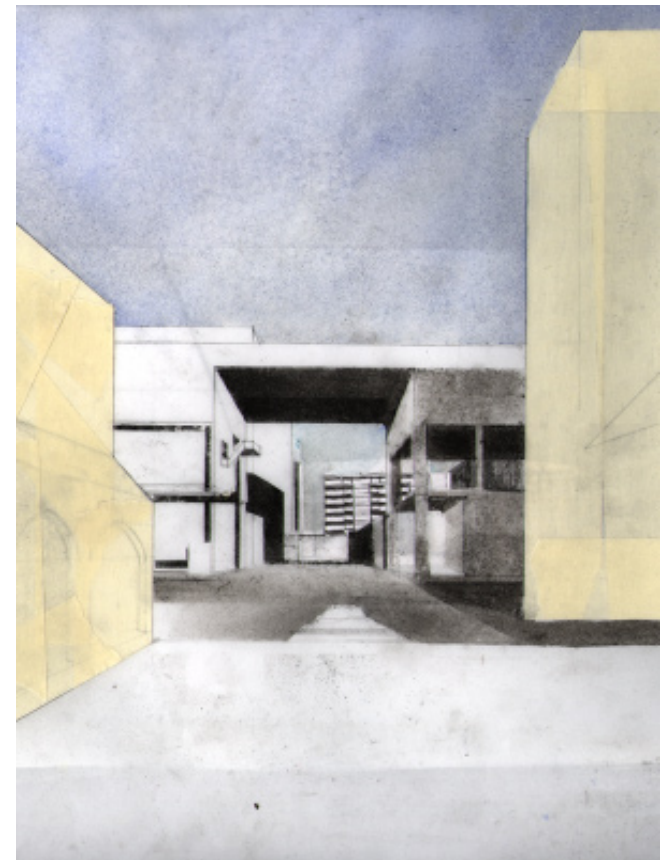


2



3

walking through the Square towards the site



Architecture unfolds through the experience of its boundaries. The initial encounter with **the surface that encloses space, triggers the consciousness of the place.**

Selected

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15 (top right) Three Accentuated Groups

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