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FABRIZIA BERLINGIERI
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DESIGN PROCESSES FOR TRANSITION

LetteraVentidue

130
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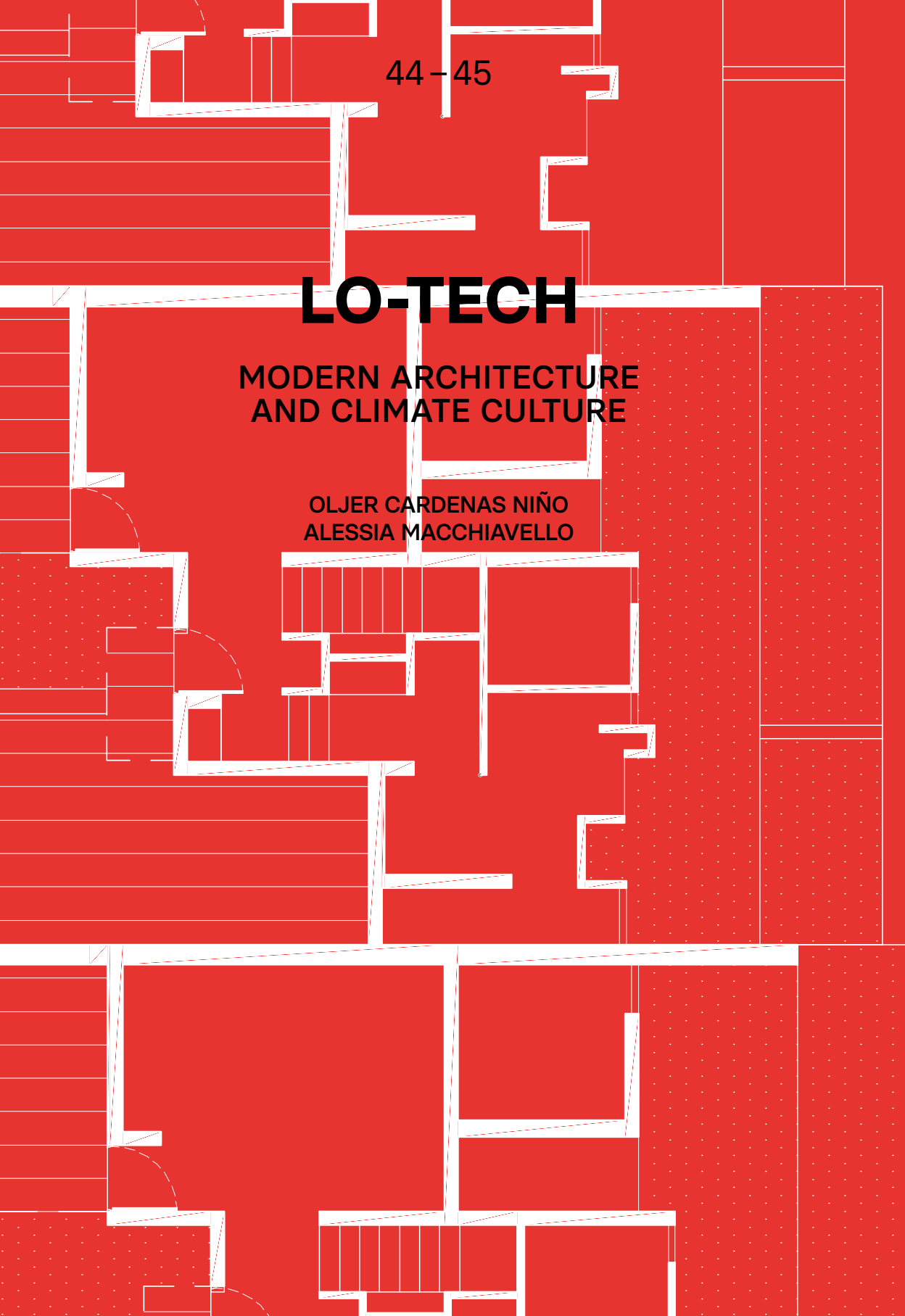
LO-TECH

MODERN ARCHITECTURE AND CLIMATE CULTURE

OLJER CARDENAS NIÑO
ALESSIA MACCHIAVELLO



Tool | Design Anatomy

Along the analogy between architecture and anatomy and as Rafael Balboa specifies: “As much as architecture employs the section as a representing tool to understand spatial qualities, human anatomy employs dissection on the body as a research methodology”, the instrument to dissect, describe and examinate the membrane, is the Design Anatomy.
The human skin contains different structures, which by external factors develop different characteristics, to adapt to the surrounding conditions, as an example, the variations in human skin color are adaptive traits that correlate closely with geography and the sun’s ultraviolet (UV) radiation. In the same way in architecture, there is a common idea that each culture creates its own specific elements to construct, responding to climatic conditions, location, and resources. This generates different solutions to analogous problems, forming a range of possibilities. Thus, the skin, the building envelope, has taken on different shapes, and thicknesses and uses different technologies that respond to these conditions.
The topic is defined by two types of perimeters: the first of a typological nature, specifying housing, and the second of a geographical one, working in two different locations, India (Asia) and Mozambique (Africa), both tropical countries.
The structures that we want to analyze—threshold, comfort and visual—are here dissect into different elements that allow to classify and compare the different solutions applied in the selected case studies. Each category, in turn, is unpacked into several sub-categories to enable a comprehensive and detailed review of the solutions adopted.

The climate crisis affecting contemporary global society underscores the need for a reflection on design systems. As Buckminster Fuller exposed how systemic crises are not directly attributable to resources scarcity, but rather to a lack of design (Fuller and McHale 1963, VII), later also Tomás Maldonado identifies design hope as a necessity, not only for the figure of the architect but more generally for the role of the project (Maldonado 2017, 82). In this context, Lo-Tech architecture exemplifies a clear interpretation of how the project solves with design thinking. Lo-Tech is one of many abbreviations of the term low technology and connected to his etymological meaning it is "*a simple, unsophisticated, uncomplicated, and primitive technology... pre-dating the industrial revolution*" (Watzon 2020, 20), Lo-Tech techniques or systems use traditional or non-mechanical technology. It is the opposite of high-tech, which is a term for relatively new technology that incorporates advanced features. Lo-Tech can be also considered a design approach to understanding vernacular architecture, and structural systems that generate sustainable and climate-adapted infrastructures. As an example, this type of approach to the design process can be found in the projects carried out by different modern architects who worked in tropical areas (Fry and Drew 1947), leaving a variety of solutions that we can study today to face the current crisis.

Lo-Tech and the influence of geography

Lo-Tech design solutions are directly related to the site in which the project takes place, determined in various ways: form, materiality, and architecture configuration. As can be detected in the work of Alexander von Humboldt, there is a direct dependence between the interactions of geographic agents (climate, localization, etc.), human activities and culture, which generates a certain way of structuring the territory, and in our case constructing architecture. In this frame, Lo-Tech solutions may vary depending on the region of the world in which you are located, as an example, Amancio d'Alpoim Miranda Guedes and Pierre Jeanneret are two architects who understood the environment, culture and climate and designed Lo-Tech buildings, the first one, in Mozambique and the second one, in India.

Breathing membranes

When looking at Guedes and Jeanneret work, it is possible to identify a Lo-Tech approach, principally in the envelope of the buildings, because it's the thin membrane that separates us, covers us, protects us from the inclemency of nature: "*is that surface which interacts with the world at large. The membrane has a responsibility to protect the contents... It also makes a statement to the greater world about the building, a statement that connects the form and function of the building*" (Holliss 2017).

Literature has demonstrated that there is a link between the building membrane and climate and how: *"in the current scenario of massive urbanization and global climate change, the urban surfaces and their characteristics have a key role, as they significantly influence the quality of life in urban areas, as well as their environmental conditions* [...]. *These include the horizontal and vertical surfaces of the ground and the building envelopes, which can be characterized by different materials and can host several*

functions." (Croce and Vettorato 2021). The development of these membranes in the works of Guedes and Jeanneret are affronted from the beginning of the design process, resulting in buildings that use Lo-Tech technics that can be clearly characterized and identified. First, threshold is defined as the urban and architectural relation of the building between inside and outside. Second, comfort is intended as a physical aspect related to the ambient qualities. For last, visual, meaning the esthetic and perceptive qualities. Therefore, the three characteristics of the membrane are used as a way of describing the spatial structure of built-up areas that help in a transition process, as defined by Stamatina Kousidi, "*the envelop as a complex architectural system... with knowledge deriving from the sciences, with the changing climatic conditions*" (Kousidi 2020, 33).

Threshold

Threshold is a space of mediation between the city and the interior of the building, without this film the street does not exist, as Louis Khan expressed: "*The street is a room by agreement. A community room the walls of which belong to the donors, dedicated to the city for common use"* (Monteys 2018, 8). This dichotomy, between inside and outside, makes the threshold a three-dimensional element that helps to mediate public and private relations and that influences the character of open space. This relationship means that interventions into the public, it can result in changes in the architecture of the façade and vice versa providing a platform for the open space realm.

Comfort

Lo-Tech design is connected to materiality, but also with orientation, which affects the interior comfort of the building. Passive ventilation systems and sun protection elements are some of the solutions that impact thermal efficiency. The membrane of the building is transformed as interacts with the environmental situation, becoming a spatial place, that helps with the performativity of the element as David Leatherbarrow and Mohsen Mostafavi claim, *"The autonomy of the surface, the 'free façade', presumes a distinction between the structural and nonstructural elements of the building, between the frame and the cladding"* (Leatherbarrow and Mostafavi 2005, 8).

Visual

As Finnish architect Pallasmaa noted almost a quarter of a century ago in his influential work "The eyes of the skin. Architecture and the senses", architects have traditionally designed primarily for the eye of the beholder. The envelope is the building's outer skin, the cover of it, but, at the same time is the connection element to the city, it must make sense in both roles at once, as also David Leatherbarrow and Mohsen Mostafavi said: "*The properties of a building's surface—whether it is made of concrete, metal, glass, or other materials—are not merely superficial; they construct the spatial effects by which architecture communicates. Through its surfaces a building declares both its autonomy and its participation in its surroundings."* (Leatherbarrow 2005, 8)

Finally, the reflection on how Guedes and Jeanneret interpreted the Low-Tech system of the vernacular architecture

and used in their buildings can display a potential actualised approach, in which the needs related to climate crisis can be translated into opportunities for the project.

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Threshold

Door step

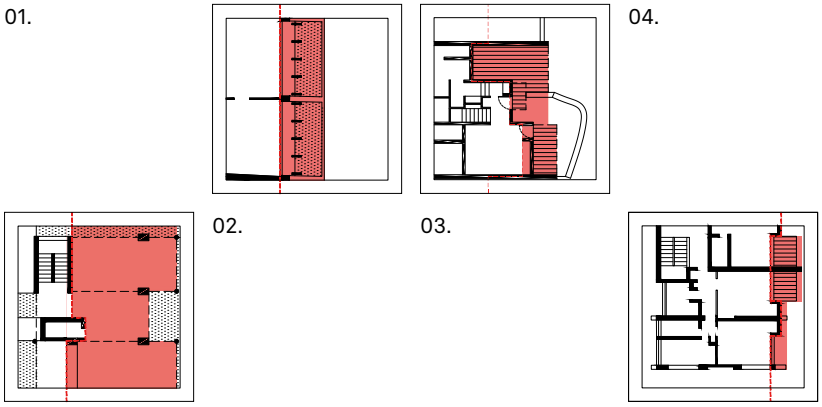
Veranda / Porch

01.

02.

03.

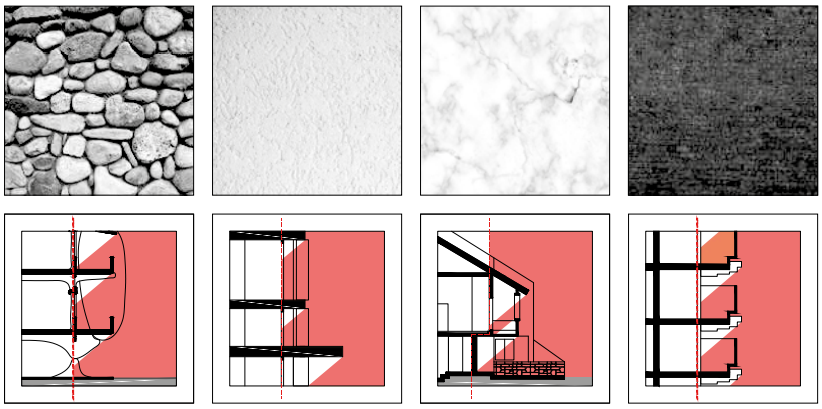
04.



Comfort

Material

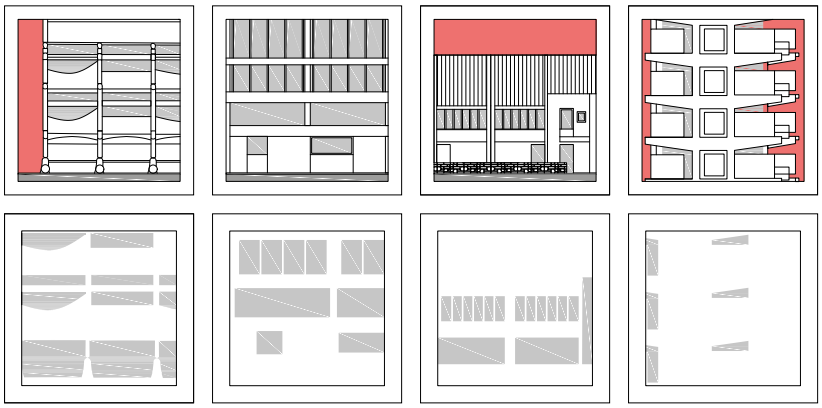
Filter Protection



Visual

Composition

Permeability



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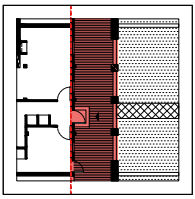

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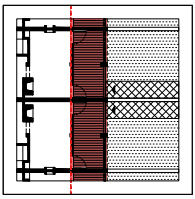

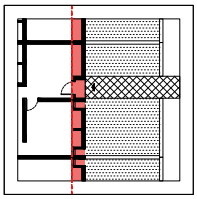

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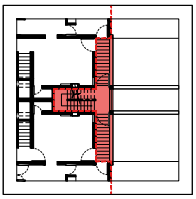

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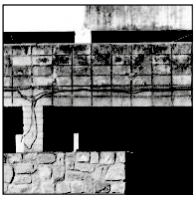
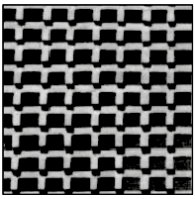
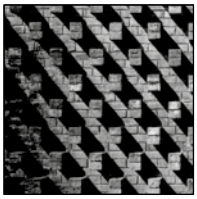
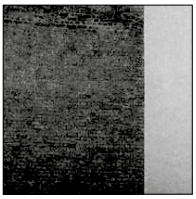
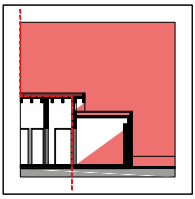
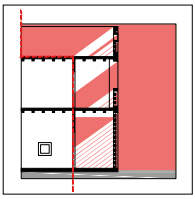


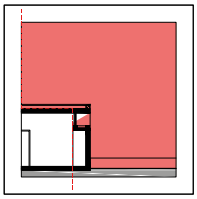


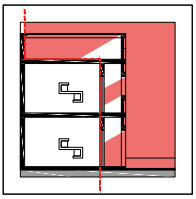


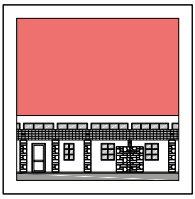


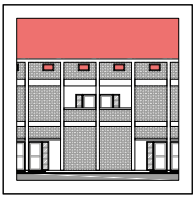


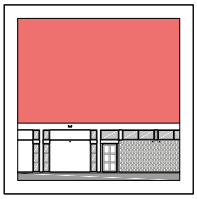


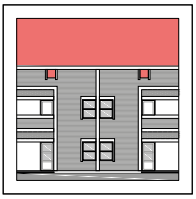


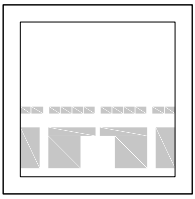


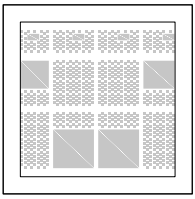


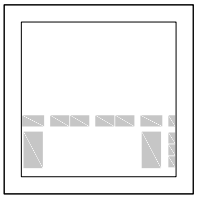


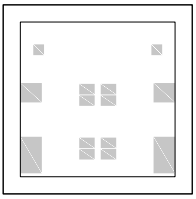










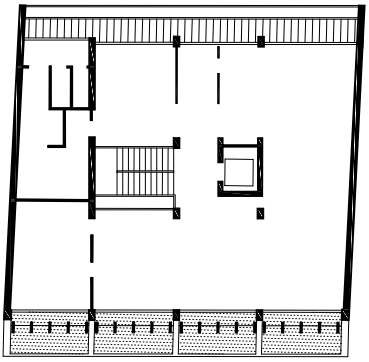


Pierre Jeanneret

01.

Smiling Lion
Maputo, Mozambique
1956
Amancio d'Alpoim Miranda Guedes

Floor Plan



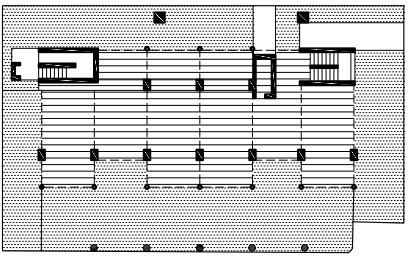
View of the Verandah

Threshold:	Door Step	
	Verandah	+ + +
Comfort:	Material	+ + + +
	F. Protection	+ + + + +
Visual:	Composition	+ + + + +
	Permeability	+ + +

02.

Mann George
Maputo, Mozambique
1954
Amancio d'Alpoim Miranda Guedes

Floor Plan



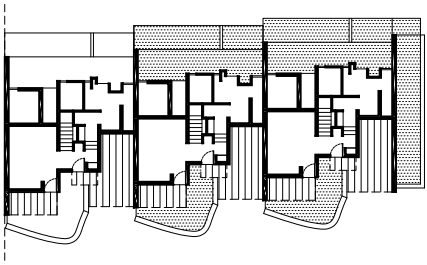
View of the Door step

Threshold:	Door Step	+ +
	Verandah	
Comfort:	Material	+ + +
	F. Protection	+ + + +
Visual:	Composition	+ + +
	Permeability	+ + +

03.

Doze Casas
Maputo, Mozambique
1954
Amancio d'Alpoim Miranda Guedes

Floor Plan



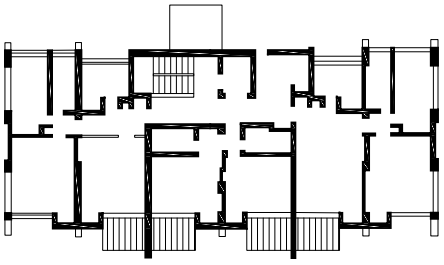
View of the Door step

Threshold:	Door Step	+ + + +
	Verandah	
Comfort:	Material	+ + + +
	F. Protection	+ + +
Visual:	Composition	+ + + +
	Permeability	+ + +

04.

Prometheus
Maputo, Mozambique
1951
Amancio d'Alpoim Miranda Guedes

Floor Plan



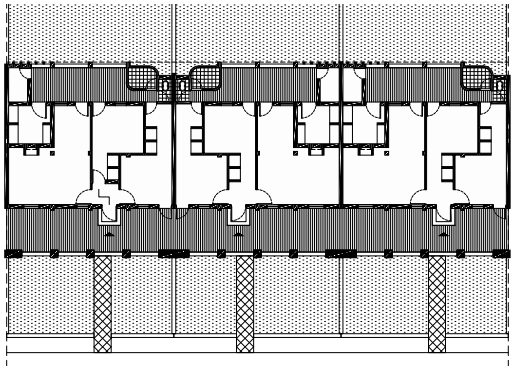
View of the Verandah

Threshold:	Door Step	
	Verandah	+ + +
Comfort:	Material	+ + + +
	F. Protection	+ + + +
Visual:	Composition	+ + + +
	Permeability	+ +

05.

House Type T10-JD
Chandigarh, India
1956
Pierre Jeanneret

Floor Plan



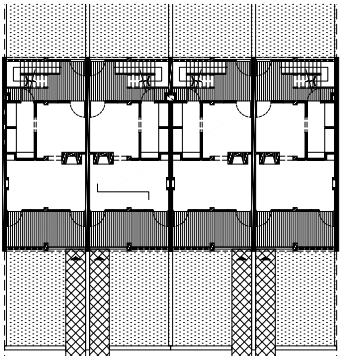
View of the Verandah

Threshold:	Door Step	
	Verandah	+ + + +
Comfort:	Material	+ + + + +
	F. Protection	+ + + +
Visual:	Composition	+ + + +
	Permeability	+ + +

06.

House Type T10-JB
Chandigarh, India
1956
Pierre Jeanneret

Floor Plan



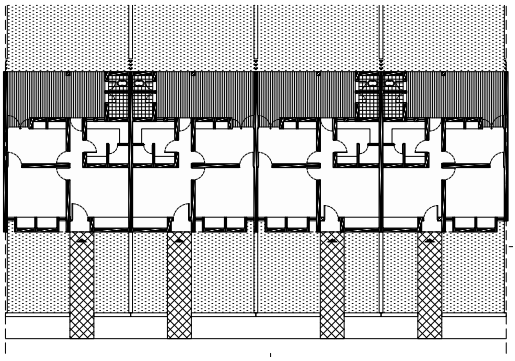
View of the Verandah

Threshold:	Door Step	
	Verandah	+ + + + +
Comfort:	Material	+ + + +
	F. Protection	+ + + + +
Visual:	Composition	+ + + + +
	Permeability	+ + + +

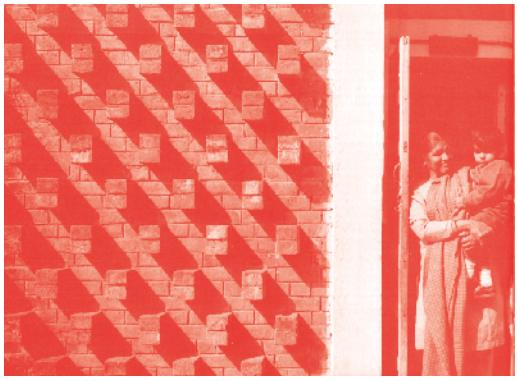
07.

House Type T11-JB
Chandigarh, India
1958
Pierre Jeanneret

Floor Plan



View of the Door step

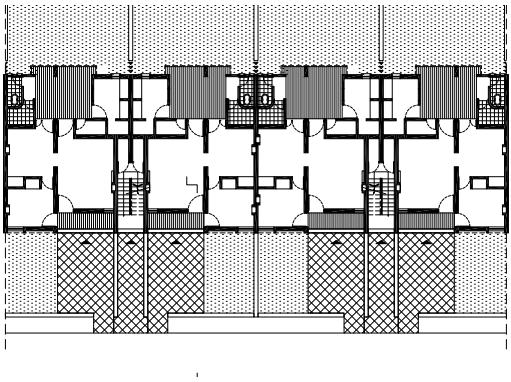


Threshold:	Door Step	+ + +
	Verandah	
Comfort:	Material	+ + + +
	F. Protection	+ + +
Visual:	Composition	+ + +
	Permeability	+ +

08.

House Type T11-JD
Chandigarh, India
1961 - 1966
Pierre Jeanneret

Floor Plan



View of the Door step / Verandah

Threshold:	Door Step	+ + + +
	Verandah	
Comfort:	Material	+ + + +
	F. Protection	+ + + +
Visual:	Composition	+ + + +
	Permeability	+ + +