



LA CASA

ESPACIOS DOMÉSTICOS
MODOS DE HABITAR

ABADA EDITORES

LA CASA

ESPACIOS DOMÉSTICOS MODOS DE HABITAR

II CONGRESO INTERNACIONAL CULTURA Y CIUDAD
GRANADA, 23-25 ENERO 2019



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La Casa. Espacios domésticos, modos de habitar
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La fachada como *interface* en la arquitectura residencial carioca: repertorio de proyecto

The Façade as an Interface in the Housing Architecture of Rio de Janeiro: Design Repertoire

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Resumen

Un análisis atento de los elementos que componen la cáscara externa de los edificios es esencial para la construcción de una historia de las soluciones referidas a un tema clave en la arquitectura, la relación entre espacio, estructura y cerramiento. Con el mismo espíritu, este trabajo mira hacia la arquitectura residencial moderna producida en Río de Janeiro desde sus planes de cerramiento. Analizaremos las fachadas de dos edificios representativos de la "escuela carioca": Julio Barros Barreto (1947-50), de los hermanos Roberto; y Bristol (1950), de Lucio Costa. El objetivo es explorar un repertorio de elementos de fachada y cómo ésta produce una transición dilatada entre interior y exterior. El tema se relaciona con la forma en que los planos de cerramiento se articulan para diferenciar ámbitos privado y público, y con ello ayudar a entender qué tipo de ciudad tienen potencial de generar estas arquitecturas.

Palabras clave: fachadas, estructura, espacio, arquitectura moderna, escuela carioca

Bloque temático: El proyecto doméstico como núcleo de la modernidad: casa singular y vivienda colectiva, del Movimiento Moderno al siglo XXI

Abstract

A close analysis of the elements that compose a buildings external envelope is essential to construct a history of solutions regarding a key architecture issue, the relation between space, structure and closure. It is in this spirit that this paper addresses the façades of collective housing architecture of the Rio de Janeiro school of modern architecture. We will analyze the façades of two representative buildings of this production: Júlio Barros Barreto (1947-50), from the Roberto brothers; and Bristol (1950), from Lucio Costa. The aim is to explore a design repertoire of architectural elements for the enclosure plans and related to the way the façade constitute a dilated transition between interior and exterior. The issue is also related to the way in which the enclosure plans are articulated to differentiate the private and public spheres, and thereby help to understand what type of city these architectures have the potential to generate.

Keywords: *façades, structure, space, modern architecture, Carioca school*

Topic: *The domestic project as the heart of modernity: the single, one-off house and collective housing, from the Modern Movement to the 21st century*

Introduction

In *Histoire de l'architecture modern. Structure et revêtement*, Fanelli and Gargiani analyze buildings' façades to construct a history of solutions adopted to address a key issue in architecture, the relation between space, structure and closure.¹ With the same spirit, this article proposes to examine the façades multifamily housing projects produced by the Rio de Janeiro school of modern architecture, questioning how elements of structure and closure are combined to establish different ways of relating inner and outer spaces. Two reasons justify this choice: only with modern buildings façades have been liberated from being supporting structures, which created new possibilities of spatial articulation; and the collective housing design of Rio de Janeiro's school represents a high point in modern Brazilian architecture, and it is a legacy whose fecundity is perhaps not exhausted. Thus, we will analyze the closing plans of two buildings considered representative of this production: Roberto brother's Julio Barros Barreto (JBB) (1947-50) and Lucio Costa's Bristol (1950).

Our aim is to examine façade design of the body of these buildings focusing on two themes that are highly praised in modern Brazilian architecture: façade understood as an extended transition between interior and exterior, and employment of filters not only as protection elements, but also as plastic devices. In such task we encounter design solutions which are recurring in modern Brazilian production, e.g. independence among structure, closing elements and internal partitions; use of recessed supporting elements and projecting slabs for free façade composition; sometimes compulsory need of external shading; possibility of not separating internal and external air; use of different types of filters; use of balconies as traditional elements transplanted to high-rise buildings. And one of the ways to address these issues is to focus on the reciprocity between the intentions behind architectural design and imperatives of construction, particularly the role of technique. Finally, this study also relates to how façades articulate interior and exterior spaces, differentiating private and public spheres by defining expanded boundaries and transitions between them and thereby helping to understand what sort of city these architectures have potential to generate.

We will briefly describe each building and then enter into specific questions related to façades. The detailed analysis presented were made possible by on-site surveys followed by redrawing of each project in larger scales and by the construction of digital models of parts of their main façades.

1. Two buildings

1.1. JBB Building (1947-50), Roberto Brothers

Planned as middle-income housing project for members of Institute of Retirement of State Servants, JBB building was designed in 1947 by Marcelo, Milton and Maurício Roberto, and built in 1950. The building is located on plot's corner with a sloping topography and distant 200m from Botafogo's beach seashore, a place of generous landscape, overlooking Guanabara Bay and Sugar Loaf, two important Rio de Janeiro's landmarks.

The building consists of two blocks (40m x 10m and 65m x 12m), each containing five rows of double height apartments varying from 110m² to 150m². The structural module is 6,50m wide, combining various spans in depth. The plinth is recessed in relation to the body of the buildings

¹ Giovanni Fanelli and Roberto Gargiani, *Histoire de l'architecture moderne. Structure et revêtement* (Lausanne: Presses polytechniques et universitaires romandes, 2014), 15.

and was originally destined to contain storage and commercial spaces. Responding to the topography, blocks are placed at different levels, set away from plot's limits, and are hinged in an angle, connected by walkways to a vertical circulation tower containing elevators and stairs.

The building presents a singular and complex system of spatial distribution and circulation, with vertical interpenetrations, resulting from use of the section as the main instrument of design and spatial exploration. This feature is present also in other projects of the Roberto brothers for residential buildings. As all units comprise two floors, balconies in the front façades assume double height, promoting spatial integration between different sectors of the unit. However, the two blocks differ in balconies' treatment: in the longest one they are actually verandas, with a depth of 2m, but in the shorter one they are not accessible, accommodating only a 50cm deep gap for a balcony garden. In both cases, upper window frames that open onto the verandas –or balcony gardens– are protected by venetian blinds with a mixed run and tilt system.



Figure 1: Julio Barros Barreto
Source: M. Oliveira Eskinazi (2017)

The spatial distribution of apartments and circulation spaces running along the back façade intercalate social and service access in different floors. The social corridor reaches lower floor – which contains high ceiling living room, double height balcony, kitchen and maids quarters– and the service corridor – which reaches the intermediate level containing a small laundry and giving access to upper floor with three bedrooms and bathroom. Apartment's internal floors are elevated in relation to horizontal circulation spaces, allowing windows to open to corridors above height of passers, thus providing crossed ventilation and privacy to internal spaces. Also, while the social corridors have large glass panels distributed along the whole extension, the service corridors are open to external air, with gaps located in strategic heights –close to floor and ceiling– thus providing lesser exposure and guaranteeing permanent ventilation, light and view for back facing bedroom.

1.2. Bristol Building, Guinle Park (1950), Lucio Costa

The Bristol is part of a group of buildings designed by Lucio Costa between 1948 and 1952 in the newly created Guinle Park. It's design was originally planned as a luxury residential development that combined six apartment buildings with lots for single-family residences. The complex was then reduced to only three multifamily buildings closest to the Park's access gate: Nova Cintra (1948), Bristol (1950) and Caledonia (1952). Measuring 65m x 15m, each block has independent concrete structure with modules of 4.20m x 6.20m, flat slabs projecting beyond the supports, ground floor with pilotis in double height and parking garage in the basement.



Figure 2: Bristol and Caledonia

Source: Nelson Kon, in *ArchDaily (website)*, March 26, 2012, consulted on November 10, 2018, https://www.archdaily.com.br/br/01-40036/fotografia-e-arquitetura-nelson-kon/parqueguinle_arqluciocosta/

Its plot, with a sloping topography on its edges and an oval depression in middle, is limited by a street to the south and a mansion to the west. The insertion proposed by Lucio as broken line forming a segmented arch tried to maintain Cochet's 1916 proposal.² As consequence, Bristol and Caledonia were implanted along the sloped edge of the terrain, implying unfavorable solar orientation, with its main façades facing the afternoon sun as well as the park and beautiful view beyond the mansion. Their distinguishing feature is precisely the way Costa responds to such conditions, by protecting west façades with a combination of vertical brise-soleil and perforated bricks –cobogós– which partially cover a sequence of loggias along their main façade's whole length. The loggias with cobogós relate to social areas of the apartments, while the verandas with brise-soleil correspond to bedrooms.

The Nova Cintra, the first to be built, is aligned with the street, with its main glazed façade facing southeast. The volume is responsible for making a transition between park and city. Unlike the others, where the building entrance in the pilotis is reached through an open platform interspersed by gardens, stairs and ramps, in Nova Cintra, due to its more urban condition, the plinth has shops and services placed slightly above street level, accessible from street through a garden. In the body, in the southeast façade facing street, glass planes inserted between slabs are parted in three heights, with a fixed lower module painted on its inner face, blue, referring to the window sills, and two movable upper guillotine modules that descend to the floor. Northwest façade of the block is similar to the west façades of Bristol and Caledonia, alternating vertical brise-soleil and cobogós covering a set of loggias.

Despite differences regarding orientation and urban situation, the three buildings share similar plans, alternating simple apartments in the ends and double floor apartments in the middle, with generous areas ranging from 225m² to 515m². Each building has two independent cylindrical volumes containing stairs attached to main bar, opaque in Bristol and Caledonia and glazed in Nova Cintra. Each column of vertical circulation serves two columns of apartments, thus reducing to minimum the space dedicated to horizontal circulation in floors and allowing apartments to reach both façades. Unlike JBB, where the section is defining instrument for designing internal space of the apartments and, consequently, façades, in Guinle Park's buildings few vertical interpenetrations point to a way of design more concentrated on composition of plans and façades.

Contemporaries to the Unité d'Habitation in Marseilles (1946-52), both JBB and Bristol share issues with Le Corbusier's project, such as idea of stacking duplex units, alternatives for articulation between vertical and horizontal circulations and solutions to provide apartments with cross ventilation and double orientation. To these questions we can add others mentioned by Lucio Costa, which are also common to the three buildings: an architecture adapted to the park, of elongated buildings, detached from the ground, and that had loggias throughout the main façades.³ And it is precisely through the loggias that we conduct the following analysis.

2. Trinomial: space x structure x closure

Aesthetic and functional developments of independent structural grid system redefined architectural closures' nature. Disengaged from decorating and supporting functions, walls have become filling, coating, container, skin, positioned back between or in front of structure's

² Guilherme Wisnik, *Lucio Costa* (São Paulo: Cosac Naify, 2001), 87.

³ Lucio Costa, *Lucio Costa: registro de uma vivência* (São Paulo: Empresa das Artes, 1995), 205.

support elements. In this sense, the solutions employed in each of the buildings represent different approaches regarding the trinomial space, structure and closure. Next we will analyze composition strategies of façades investigating spatial relations and plastic effects made possible by combination of these three systems.

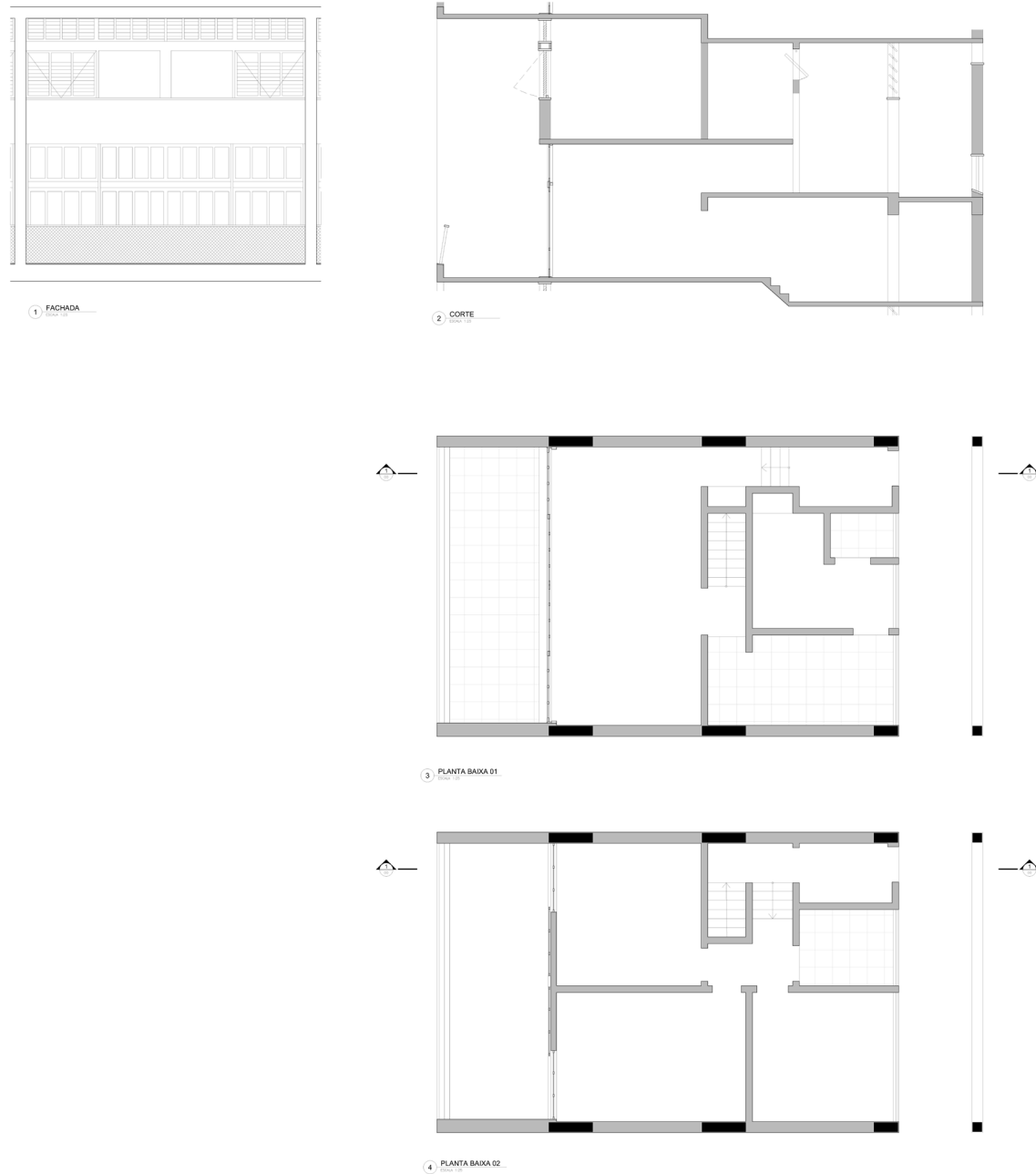


Figure 3: Julio Barros Barreto, stretch of façade, section and plans
Source: Drawings by Antonio Frederico Lasalvia and Jonatas Sousa (2017-18)

According to Fanelli and Gargiani, autonomy of façade presumes a distinction between structural and non-structural elements of buildings, or between structure and closure. In both cases, dissociation of these systems, as occurs in the Domino System, each one being able to respond to its own logic, appears in different ways. JBB, on the one hand, hides structural grid

inside the walls in typical plans and undress it only on its ground floor. In the building body's plan, regular grid organizes at same time supporting structure and spatial distribution. Each apartment occupies a structural span in width –6,5m– and there is no evidence of the position of the structure within it. In the façade, vertical and horizontal planes that reach outwards mark rhythm of the grid and expose the distribution of units within blocks. However, there still prevails an idea of autonomy in the relationship between structure and enclosure, since layers of balconies in main façades are advanced in relation to supports and are, to a large extent, constituted by glass panels and free spans.

Costa, on the other hand, partially exposes the autonomy between structure and space. The regular grid is again the design instrument employed for organizing space and structure. In Bristol and Caledonia a slight displacement of structure with respect to walls that divide main internal spaces leaves circular columns always evident inside rooms, visually emphasizing independence between systems. That is, autonomy between the structural and spatial elements are relative, since they follow the same dimensional grid, but do not match physically. In main façades, the grid reappears prominently, subdividing perforated plane of brise-soleil and cobogós. While horizontal lines are actually slabs, vertical ones are not their supporting structure. Besides, they are aligned to inner spatial divisions and not columns, which can be seen occupying corners of the deeper balconies. Despite visual presence of the grid, here there is no clear indication of distribution of apartments in the building, like in JBB, or of its internal organization, even though there is a correspondence of closings and types of spaces behind them. Grid lines and its lace-like filling suggest a kind of overall pattern, a patchwork that covers the entire façade with relatively little variation.

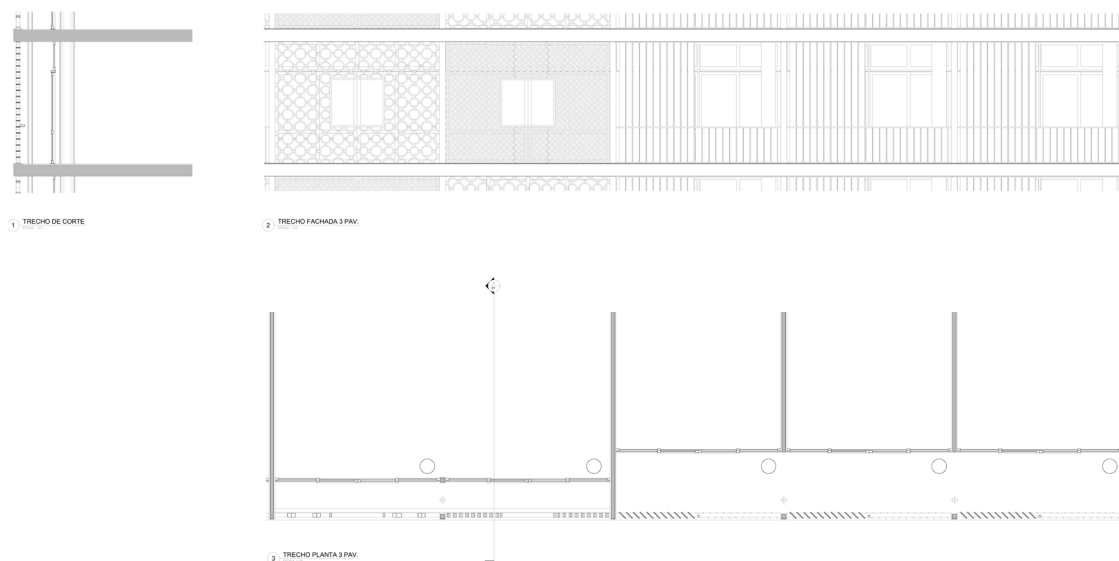


Figure 4: Bristol, stretch of section, façade and plan

Source: Drawings by Antonio Frederico Lasalvia and Jonatas Sousa (2017-18)

In both cases, façades' plastic composition results from serial constructions, starting from incorporation of repeated patterns coming from the grid as design tool. With this, both designs reconcile individual expressions with repetitive manufacturing systems. Despite differences in degrees of façades' autonomy in relation to internal organization and distinction between structural and non-structural elements, the two buildings share some questions in the way they

relate space, structure, and closure. Despite the visual presence of a modular rhythm on the façades, both buildings refuse to use bare structure as a solution for formal characterization of architectural envelope, except for exhibition of stacking of floors in front façades. This does not mean that the envelope is indifferent to the structure, since there is a marking whose rhythm is the same of the structure, nor that structural device has lost importance within the process of design, but rather adherence to grid's logic as generator acquires such force that it becomes a design's preliminary condition. That is, the structural order takes place from a geometric ordering that, to varying degrees in each case, is clearly visible only in plan –the regulating lines that Le Corbusier defines as "automatic".⁴ The structure follows the grid, but its independence from the closing system frees design to follow considerations proper to spatial relationships.

In addition, in both cases pillars are pulled back into interior, a feature that Fanelli and Gargiani described as the fundamental constructive principle of Le Corbusier's five-point theory, from which the rest derive, especially free façades and ribbon windows.⁵ In both analyzed buildings recess structure is requirement to obtain large window panes and, consequently, better lighting, ventilation and views. Free façade is the fundamental for two key issues common to both projects: deepening of outer envelope of the buildings through use of "loggias" and consequent expanded transition between interior and exterior; and in using filters as both protective and visually expressive elements.

2.1. Façade as an expanded transition between interior and exterior

But there was another peculiarity that went unnoticed by the users themselves, that is, the purpose of reviving, in the apartment plans, a characteristic of the traditional Brazilian house: the two balconies, social and domestic –two spaces, one in front, to receive, another to the back, connected to the dining room, the rooms and service areas. (...) It was the essence of this traditional scheme that was tried to be revived in the apartments of the Guinle Park: a kind of winter garden, contiguous to the living room and a room with no specific destination, connected to the rooms and the service; a more formal and another more at ease, corresponding to the domestic veranda.⁶

Costa's explanation of transposing balcony from Brazilian traditional house to residential building as essence of the scheme adopted for Guinle Park's buildings exemplifies his particular way of designing, in which elements of articulation between interior and exterior, such as patios and balconies, are main generators. In addition, balconies also synthesize his way of combining vernacular and modern repertoires of formal and constructive solutions, an approach also perceived in JBB, even in different degrees.

Costa incorporates the balcony's theme in previous projects, such as the residences Marinho de Azevedo Filho (1938), Heloisa Marinho (1942), Saavedra (1942), or Nova Friburgo's Park Hotel (1944-45). Also for Le Corbusier balconies have been recurring theme since his initial modern designs, being present in Clarté Apartments in Geneva (1932), where he explores the double height balcony, or in Algiers's administrative buildings (1933-38), arriving at Marseille's Unité d'Habitation, also in double height.

Roberto brothers did not cultivate a tradition in using balconies, but have found a great research topic in exploring filters, all kinds of permeable and perforated panes used for solar protection and privacy. These filters are present in diverse configurations since their inaugural works, such

⁴ Fanelli and Gargiani, *Histoire de...*, 274.

⁵ Fanelli and Gargiani, *Histoire de...*, 283.

⁶ Costa, *Lucio Costa...*, 212.

as the Brazilian Association of Press, ABI (1935), Santos Dumont Airport (1937), the Resecurity Institute of Brasil, IRB (1943), the MMM Roberto building (1945) and projects conceived after JBB, as the headquarters of Companhia Seguradoras (1949) and residential buildings such as Finusia and Dona Fátima (1951), and Sambaíba (1953).

In JBB and Bristol, the loggias acquire properties linked to their original functional features – social veranda, to receive, or domestic, linked to bedrooms and service areas– as well as formal features – such as breaking façade’s planarity, expanding its depth by pulling back the closing planes. In addition, in both the verandas give meaning to spaces by affording certain kinds of occupation.

In Bristol, balconies are present only in main façade, and have different sizes: they are deeper when contiguous to bedrooms –affording extended permanence– and shallower, and wider, when facing social areas –where a 70cm cushion separates the outer solar protection element from glazed closing plane, being more of an extension of living room than a place for permanence.



Figure 5: Bristol, main façade loggia
Font: M. Oliveira Eskinazi (2017)

In JBB, balconies in the long block’s main façade also create an extension of the living room towards the exterior, but here they offer space for permanence in outside, promoting, with their double height, sensation of spatial expansion. Even the narrow balconies in the smaller block manage to combine this natural feature recovered from ground floor with a long view towards

landscape in the distance. In all cases, balconies produce an expanded transition between inside and outside, creating an “in-between”⁷ spatiality which belongs both interior and exterior.



Figure 6: Julio Barros Barreto, main façade loggia
Source: M. Oliveira Eskinazi (2017)



Figure 7: Julio Barros Barreto, rear façade loggia
Source: Antonio Frederico Lasalvia (2017)

⁷ David Leatherbarrow and Mohsen Mostafavi, *Surface Architecture* (Cambridge, Massachusetts: The MIT Press, 2005), 58.

It should be noted that both buildings present an unique common condition with respect to landscapes. The drawings made by Le Corbusier (1932) and published in *De la fenêtre au pan de verre dans l'oeuvre de Le Corbusier* represent a glass wall formed by some key features: a frame, a horizon, vertical uprights and distant landscape reduced to its representative elements fused to glass. The view of an unlimited horizon, however, does not find support in common reality of denser urban contexts, where modern residential buildings usually sit closer to one another. Curiously, the view of a rich landscape turned out to be a condition common to the main façades of both JBB and Bristol, therefore close to Corbusier's drawing's ideal.

2.2. Filter as multipurpose architectural device

JBB and Bristol present different solar orientations. While the former is facing south and southeast, the latter faces setting sun. Despite that, both employ perforated planes as external elements on their façades, working both as filters that mediate the relationship between interior and exterior, and as visually expressive elements. In both cases these filters differ from Corbusian's precedents, whose experiments around brise-soleil concentrated in general in concrete planes attached to façades.

Here filters used are latticed planes, traditionally manufactured perforated ceramic blocks – cobogós– or wooden shutters. All performing similar functions to industrial brise-soleil, but all refer to pre-modern constructive traditions, either through their materiality –as in the clay perceived in Costa's cobogós– or through their image –on lattice panes and shutters that refer to the “muxarabi”, wooden filters of Arabic origin present in south American colonial architecture. The intention to promote continuity with tradition by using elements of local culture and inserting them into a new architectural syntax and through new means of production is a well-known quality of Rio de Janeiro school of modern architecture.

In both buildings large glass panes that fill spans from floor to ceiling are associated with perforated planes that acquire filter's function, producing transitions between inside and outside that are not totally explicit or unmediated. In JBB, where façades have less solar incidence, the wooden shutters located on balconies' upper floor provide privacy and allow darkening the interior. Wooden lattice panes employed as inclined external barriers in balconies also offer a smooth mediation of view towards the Bay by ensuring visual permeability. In addition, these filters act as plastic devices, which compose façades' design offering color and texture of a delicate filigree to apartment block's extensive vertical face.

In Guinle Park buildings, the relevant innovation proposed by Costa consists of incorporating filters extensively into the balconies, either as cobogós or as brise-soleil. Cobogó panes consist of two different types that vary in shapes and size, occasionally perforated in the center by a window like gap bordered by concrete frame. Vertical brise-soleil infill are made by a series of fiber-cement planes whose materiality is nulled behind color blue, in Bristol, or pink in Caledonia.

These filters both connect and separate interior and exterior spaces, producing a kind of elusive communication with the landscape and park's public sphere. From the living room, exterior is perceived through a screen like wall, being directly visible only through few square gaps that pierce the cobogó infill. In order to contemplate the park frankly, one must stand next to this small opening. The filtered light is abundant through the glass panes and gets dramatic as the afternoon falls and drops of yellowish light fills the room. From outside, the screen also mediates incoming views from the park, especially for the apartments in lower floors, where interposition of cobogós and brise-soleil offer some degree of privacy. Finally, a perforated external plane also perform as a plastic and expressive features which cover the whole main

façades as a kind of patchwork of lace-like tissues, making the large blocks appear lighter and somewhat delicate. Square openings that punctuate panes refer to banal windows which, combined with the serially produced brise-soleil and somewhat imperfect and earthy cobogós, situates façade in a space of ambiguous meaning, between modern architecture's prosaic and sophistication.

3. Conclusions

Filled and empty frames generated by combining glass panes, thick balconies and filters configure, in each of the situations studied, a system of layers that, due to different degrees of permeability, dilute and expands assigned sealing function to the façades. Thus, the combination of balconies with filters is also responsible for an idea of dematerialization of façade's plane, which then happens in several layers. In addition, in both cases, ordering grids seen in the façades, which relate to their respective modular systems and to volumes they help generate, mix a vernacular vocabulary with industrialized elements, combined from the use of classical compositional procedures such as modénature, rhythm, repetition, symmetry, and balance. The singularity of each of these buildings is found both in synthesizing spatial possibilities arising from combining regular structural grid with recess of supports into interior, generating the possibility of exploring balconies as transition spaces, or spaces "in-between"; and in synthesizing climatic considerations of each façade with imperatives of industrialized construction, which makes use of prefabricated and repetitive elements, allied with individual expressions of each architect. And it is precisely from these points that this modern architecture for multifamily housing gets its Brazilian colors.

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