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THE INFLUENCE OF CLIMATE ON THE FORMS OF BRAZILIAN MODERNIST ARCHITECTURE IN THE YEARS 1925-1960

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Introduction

The achievements of European and North American engineering, architecture and fine arts in mid-19th century and onwards resulted in 1930s in the formation of a unique formal language which proved so potent in defining modernist architecture that it enabled coining the term “International Style”. An important input to the process was given by utopian architectural visions dating back as far as the French Revolution, but the principal drivers in structuring the fundamental principles of avant-garde were Le Corbusier’s five points of modern architecture. The language of architectural form developed in Europe

made use of the possibilities offered by modern technologies and structural solutions. Free, non-supporting facades, ribbon windows, large glazings and leisure areas on flat rooftops were designed not only to illustrate what modern technology was capable of, but also to improve living conditions, particularly through increasing the availability of sunlight. At the same time, they offered a good reason to experiment with the forms of artistic expression that were a prominent characteristic of the emerging canon of avant-garde architecture.

Brazil was the first tropical country to embrace modern European architectural concepts. Starting from late 1920s, Brazilian architecture followed

the theoretical concepts of European Modernism, encouraged by reports of avant-garde ideas put to practice which reached Rio de Janeiro and São Paulo through European immigrants and Brazilians who returned to their homeland having studied architecture on the Old Continent.¹ According to Lucjan Korngold, a graduate from the Faculty of Architecture of the Warsaw University of Technology who emigrated to São Paulo in 1940, “the mild climate of Brazil made it much easier to implement the boldest of Le Corbusier’s ideas than Europe would have allowed, where snow and frost have hindered many a daring architectural idea.”²

The most typical materials and textures adapted by young modernists from the colonial variety of Portuguese baroque – white plaster, *azulejos*, timber, to name just a few major examples – were welcomed by the Brazilian public as its own, local elements in the “cosmopolitan” modern architecture. This was already possible at the time, even though efforts had been made to eradicate the Colonial Baroque heritage and uproot it from the collective consciousness of the nation since the country declared independence in 1822 (Fig. 1, 2). A century had to pass before the baroque could be re-discovered and generally accepted as historical heritage promoting a sense of community and national pride.

The golden period in the history of Brazilian modernist architecture is marked – albeit rather arbitrarily – by the date of publication of the first modernist manifestos in 1925³ and the spectacular crowning of this heroic period, the founding of the country’s new capital, Brasília, on 21 April 1960. Four years later, the coup d’état and the beginning of military dictatorship in Brazil cut short further development of Brazilian Modernism.

Protection from sunlight

Due to the vastness and geographical diversity of the country, the climate is very diverse in Brazil. An important contribution of Brazilian architects into modern architecture was inventing solutions necessary to prevent overheating and excessive sun

exposure of interiors, as well as to encourage natural air circulation and air conditioning. Subtropical and tropical regions share a humid and hot climate. In cities located along the Atlantic coast beyond the Tropic of Capricorn – Rio de Janeiro, Salvador, Recife, Fortaleza, or Belem – air humidity is the highest. Further inland, Brasília, Belo Horizonte, and São Paulo have a much drier climate and despite intense sun exposure, the living conditions are more favourable there. Cities located on the coastline further south, in the states of Rio Grande do Sul, Santa Catarina, and Paraná, enjoy a climate similar to the Mediterranean zone.

Le Corbusier’s 1930s theoretical designs for sun shades with movable panels were first reduced to practice in the building of the Ministry of Education and Health, and proved very functional additions to the outline of the facade. Many later designs of the period comprised *brise-soleil* in the form of vertical or horizontal panels, either fixed or movable. They were made of reinforced concrete, asbestos cement, metal or wood. Such sunshades designed in an innovative way to form an integral part of the facade were new to architecture and very characteristic of the modernist style, as compared to the classic solutions such as shutters, marquees etc. This new type of shading reinforced the expressive force of the facade, disrupting its traditional morphology and defying scale, which was another prominent characteristic of the modernist approach to architecture. The adjustable angle of the shades made it possible to obtain a variety of random compositions of the facade. This solution is to this day a popular choice among designers, also in moderate climate zones.

The first prominent application of European imported modern architectural concepts, however adapted to some extent to the local climatic, cultural and historical environment, was the building of the Ministry of Education and Health in Rio de Janeiro (Fig. 3-6). Gustavo Capanema, minister under President Getulio Vargas and the person responsible for the project, intended the grand magnificence of modern architecture, its literal and symbolic

¹ Studies at European universities shaped the artistic sensitivities of such Brazilian architects as (in alphabetical order): Flavio de Carvalho, Attilio Corrêa Lima, Rino Levi, and Olavo Redig de Campos.

² J. Strachocki, *Engenheiro Arquiteto*, „Architektura”, 1957, Vol. 8, p. 294.

³ In autumn 1925, two papers were published in Brazil embracing the ideas of modernist architecture and rejecting the dominating eclectic approach. Gregori Warchavchik, a Russian emigrant, published *Acerca da arquitetura moderna* (About new architecture), and just a few days earlier one of São Paulo newspapers published a letter by Rino Levi, then student of architecture in Rome.

transparency and the technological advances it employed to legitimize the reformatory programme of emancipation launched by the government. The project started in 1936. Lucio Costa, leader of the young designer team composed of Oscar Niemeyer, Affonso Reidy, Jorge Moreira, Carlos Leão, and Ernani Vasconcelos, invited Le Corbusier to oversee the design as a consultant. The solutions they applied, which were to determine the final shape of the building erected in 1943, were extremely bold and innovative for that time. The location of the building was unconventional for a representative government edifice, and so were architectural solutions it featured: the bulk of the structure was raised above the surrounding pedestrian area and propped up on pilotis, and some local air was given to the design in the form of sunshades, tropical plants and traditional *azulejo* glazed tiles on the walls.

The dramatic expression of the design was enhanced by the diversity of its main facades. The north one is sculpted by the playful “hide and seek” of light and shade in between the regular grid of the sunshades, whose adjustable panels can be regulated depending on the sun angle (Fig. 3, 4). The south facade is a flat glazed glass wall, the first one constructed on such scale in the world (Fig. 5).

The ground floor clad with *azulejos* by Candido Portinari and Paulo Rossi Osir popularized this idea among architects of the modernist movement (Fig. 7-9). The first religious facility in Brasilia, the church of Our Lady of Fatima designed by Oscar Niemeyer and erected in 1958, featured *azulejos* covering the entire outer walls of the building (Fig. 10).

Among the many kids of the renowned Brazilian *brise-soleil*, one of the most popular was vertical blades arranged perpendicularly to the sunrays during the peak hours of sun. This solution was applied in the building of the Brazilian Press Association (ABI), built in the years 1936-1938 in Rio de Janeiro (Fig. 11). This was the first all-Brazilian design consistent with the modernist principles. The architects behind it were brothers Marcelo and Milton Roberto. The building stands on a corner plot surrounded by dense architectural environment. Its main bulk is raised on pilotis above the pavement level and “weighed down” with a massive upper

part, crowned with the dynamic forms of the uppermost floor. The main feature of the facade are horizontal stripes of undisturbed sequences of densely packed vertical sun shade panels. Behind the fixed panels, arranged at an angle against the plane of the facade, there are galleries running around the perimeter of the facades, whose shaded open cubature serves as an antechamber that attenuates the heat of the sun-exposed exterior, protecting the glass-walled office space inside the building, lighted indirectly and devoid of actual street-facing windows. The dominance of *brise-soleil* over the entire facade was in line with Le Corbusier’s idea of free facade. The same solution was eventually used by Oscar Niemeyer in his design for a kindergarten, the architect’s first independent project of 1937.⁴ The west facade of the building is formed by three distinct strata of vertical shades. The adjustability of the shading panels, together with the symbolic window-like frame, give a playful touch to the otherwise minimalist facade.

An equally simple composition was adopted by Alvaro Vital Brazil in his 1946–1951 design for Edifício Clemente de Faria (Banco da Lavoura de Minas Gerais) in Belo Horizonte. This 23-storey building features horizontal stripes of vertical rotating *brise-soleil* whose varying configurations produce a vivid chiaroscuro effect on the sun-exposed facade. Similar solutions were later applied e.g. in the building of the Pioneiras Sociais foundation in the Sarah Kubitschek hospital complex, designed by João Filgueiras Lima in 1995 (Fig. 12).

The Modern Movement introduced *brise-soleil* to the native vocabulary of Brazilian architecture as an alternative to the traditional window shutters. But a modernist reinterpretation of wooden or aluminium shutters was still in use. In his two buildings in the *Louveira* residential complex erected in the years 1946–1949 – which were among the first modernist apartment blocks in São Paulo – architect João Vilanova Artigas used sash shutters which tone in the facade to form clear horizontal stripes of colour (Fig. 13). The *Lausanne* building by Adolf F. Heep built in the years 1953–1958 gets its variable look from the colourful frames of side-sliding full-height shutters dominating the facade (Fig. 14).

⁴ Originally, the design was to comprise a system of *brise-soleil* arranged in a manner similar to the one employed later in the Brazilian pavilion at the 1939 New York World’s Fair. The facade was constructed while the architect was away from

the site and proved insufficient to protect the westward facade against the intense sunlight. Having returned to the construction site, Niemeyer noticed this mistake and paid for a new system of sun shades imitating those on the ABI building.

A special kind of sun shade is intricate lattice facing of the facade, made of ceramic or concrete elements, called *cobogós*. Working to reduce the amount of light reaching the inside, *cobogós* cast a regular, geometric shade into the inside, at the same time allowing for natural ventilation of the interiors. They have been used for centuries in Arab architecture as the so-called *musharabiyyas*, whose fine, dense patterns not only provide shade, but also keep nosy passers-by at bay. They penetrated into Portuguese culture during the Moor reign on the Iberian Peninsula as *muxarabis* and later developed into the dense lattice woodwork known in Brazil.

This kind of openwork facade was used by Lucio Costa and Oscar Niemeyer in their design for the Brazilian pavilion at the 1939 New York World's Fair, and even earlier, by Fernando Saturnino de Brito and Luiz Nunes in the pioneering 1937 design of the water tower in Olinda (Pernambuco). The former was the first embodiment of Brazilian Modernism, which attracted attention from American and European designers, who started to appreciate the individuality of the Brazilian current within International Style. Part of the front facade of the pavilion was made of cubical pre-cast reinforced concrete elements. Ten years later Lucio Costa used a bold reinterpretation of *cobogós* as a leitmotif of the facades of six buildings in the residential complex of *Parque Guinle* in Rio de Janeiro, built in 1948–1954 (Fig. 15, 16). The clear-lined rectangular grid of the facade is filled either with ceramic lattice *cobogós* or with densely fitted vertical *brise-soleil*. The complex, one of the greatest architectural projects in Costa's career, made this type of shading so popular that it entered the artistic vocabulary of a number of Brazilian modernists. A similar solution was used by Oscar Niemeyer and Helio Uchoa in their design for Rio de Janeiro's South American Hospital (1952–1959). In residential architecture, *cobogós* often provided shade over a terrace, which was at that time an indispensable element of any residential apartment.⁵ The same solution was incorporated by Costa in his *Parque Guinle* complex, as well as by other designers in a number of other architectural projects in apartment blocks of residential

units across Brasilia (Fig. 17, 18). Shades based on *cobogós* and *muxarabis* can also be found in many modernist detached houses of the same period.

In countries with a tropical climate, the Modern Movement came up with the idea of a reinforced concrete canopy to shelter pedestrian routes.⁶ Oscar Niemeyer incorporated one of these in his design of the Ibirapuera park in São Paulo (1951–1955). The refined, wavy concrete canopy provides roofing to walkways joining park facilities with exhibition halls (Fig. 19). The reinforced concrete pavements of the same shape as the canopy above them are popular among members of the local community as picnic sites or convenient places to practice roller skating or skateboarding.

Rustic Modernism

Away from large metropolises, in summer and country houses, big residences of great landowners and tourist facilities, a distinct current developed within the Modern Movement. It was characterised by a focus on the local and the use of traditional materials and methods of craftsmanship. Buildings of this style often combined brickwork with wood. Poles, beams, braces and visible roof components were often made of unseasoned, only debarked logs and poles. Most of Brazil's territory has always abounded in readily available timber, but it never gained popularity in Brazilian architecture, dominated by European urban tradition of brick building. The juxtaposition of split-face stone finish, hand trowelled plaster and only pre-processed wooden elements against forms whose proportions and compositions revealed unambiguously a modernist provenance have given this type of architecture a truly unique force of expression. Classified by Brazilian historians as Rustic Modernism, it fits within the broad trend of the so-called critical regionalism, implementing its key ideas. In his representation of Douglas Kelbaugh's views on this subject, Jarosław Szewczyk wrote: "Critical regionalism expressed a need to make a spatial statement and articulate one's bond with nature, history and crafts, to demonstrate

⁵ A terrace was the centre of the business part of a flat. It was accessible from the kitchen, the servant's room and the servant's bathroom; very often windows of the flat's sanitary rooms faced the terrace, which also had an indispensable washing basin made of stone or concrete.

⁶ One of the best known examples are several metres long roofings in the university campus in Caracas (*Ciudad Universitaria de Caracas*, 1944–1970, architect Carlos Raul Villanueva)

⁷ J. Szewczyk, *Regionalizm w teorii i praktyce architektonicznej*, WAPB, Białystok 2006.

the awareness of one's limitations".⁷ It seems to offer the answer for Paul Ricour's question "How to stay modern but faithful to the past, how to bring back to life the old dormant civilisation without losing touch with the universal one?"⁸

The architect who started the return to tradition in order to enrich imported architectural paradigms was Lucio Costa, and his first project designed in this spirit was the 1937 museum of Jesuit mission in São Miguel das Missões (Rio Grande do Sul), where Costa combined new materials and technologies and fully glazed walls with elements of historical mission architecture.

Of key importance in promoting the rustic current was Costa's hotel in Nova Friburgo (Rio de Janeiro), built in the years 1940–1944. The modernist composition of the building and the functionalist plan came to existence with the use of traditional materials, technologies and craftsmanship.

The nearby private house of Carlos Ferreira, erected in 1949, was perhaps the most fitting example of this tendency to take advantage of the local building tradition. The conceptual and spatial structure was purely modernist in design, but was realized with low-processed materials and basic local technologies. The modular structural framework of wooden beams was partly left exposed, and partly filled with split stone or dirt cast on a grillage of branches (Fig. 20). In recognition of its architectural merit and low costs, the design was awarded at the Pan-American Architectural Congress in Havana in 1950 in the category of local material-based buildings.

A unique example of rustic Modernism was a real estate office building in the Samabaia condominium near Petrópolis (Rio de Janeiro), designed by Milton Roberto and built in 1954. The dynamic form of the structure created a contrast against the rustic texture of unprocessed slabs of stone. The innovative idea of a rhythmic composition of stone walls alternating with glazed glass modules formed an interesting match with the mountainous landscape surrounding it.

Tropical flora

An important contribution of Brazil into Modern Movement was the introduction of plants as an inte-

gral element of architectural design. Because of the local climatic conditions, the extremely lush tropical flora has always accompanied the country's architecture, surrounded it and even invaded it, filling each and every unused or empty space. On the one hand, this seems a dream come true from the perspective of landscape architecture and garden design, but on the other, taming this force of nature can be quite a challenging task. The aim here is not to keep the vegetation and help it thrive, but to control its excessive growth. The level of importance attached to landscape architecture in Brazil is to a large extent to be credited to Roberto Burle Marx, a landscape architect whose achievements have placed him aside the greatest names of Brazilian Modern Movement in architecture, such as Costa, Niemeyer and others. His shapely, curvy, almost romantic garden designs add an air of gentleness and complement, on an organic level, the expressive geometry of buildings. They also highlight the contrast between the voluptuous curves of dark green vegetation and the sterile brightness of modern architecture. Roberto Burle Marx's presence in the design team for the Ministry of Education and Health building and his idea to introduce tropical flora into the design proved one of the key elements that determined the groundbreaking nature of this project. Besides the splash of green on the square around the body of the auditorium, plants were also installed on the lower roof (Fig. 6). This extraordinary garden composition is accessible from the main hall and the conference room, and can be seen from the office rooms on higher floors, testifying to the profound sense of Le Corbusier's idea of the "fifth facade".

Besides the many gardens in private estates, other arrangements that merit a mention here are the greenery at the Santos Dumont Airport designed by the Roberto brothers in 1944, the park by the 18th century Jaqueira chapel in Recife (Pernambuco), established in 1954, and the biggest green project in terms of scale – Parque Flamengo in Rio de Janeiro (1953–1962), designed under the supervision of Affonso Reidy. The Flamengo park covers 120 hectares squeezed between the heavily built-up city centre and the shore of the Guanabara bay. Its design follows the ideas of modernist urban planning: the open green spaces abound in bending paved walking

⁸ Ibidem.

paths leading to the beaches, to the harbour, sports facilities and food places. The central sites of the park are the Modern Art Museum designed by Afonso Reidy in 1953–1968 (Fig. 21) and the World War II memorial monument by Helio Ribas and Marcos Konder Neto, finished in 1960. The walking paths have two-level crossings with footbridges or underground tunnels under the multi-lane traffic routes crossing the park. But the first fiddle is played by the plant life composed by Roberto Burle Marx out of local species of tropical flora.

Summary

The adoption of the formal and ideological assumptions of European avant-garde architecture in the tropical climate of Brazil and in the environment of the local architectural tradition resulted in forming a unique architectural movement – the “national style”, the likes of which emerged from modern architecture all around the world. In his attempt at summarising the achievement of Brazilian Modernism, Henrique Mindlin, one of the co-authors of the movement’s success, described its most prominent features as “emotional spontaneity striving for integration with the circumstances of land and climate, and re-assessment of the plastic language and of the means of expression, all under a growing intellectual discipline.”⁹ Far from the major European centres of Modernism, the period brought to life a number of expressive works, operating a vivid architectural vocabulary which has since influenced architecture in the rest of the world.

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⁹ H. Mindlin, *Modern architecture in Brazil*, Colibris, Rio de Janeiro 1956.

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