DOI: 10.23817/2024.defarch.4-3

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CONSTRUCTING THE TROPICAL MODERNISM. CONCRETE AND STEEL FOR THE PROJECT OF A NEW CAPITAL CITY: KINSHASA

KONSTRUOWANIE TROPIKALNEGO MODERNIZMU. BETON I STAL W PROJEKCIE NOWEJ STOLICY: KINSHASA

Abstract

Considered one of the most populated cities on the African continent, Kinshasa has a relatively short history. The research aims to investigate the metamorphosis of small villages set around a shared market area into a modern city involving urbanists and architects reunited to plan a metropolis. Through a qualitative method based on the literature analysis, the use of concrete and steel is studied as a quintessential epiphany of tropical modernism. The works of C. Laurens and E. Palumbo demonstrate the rationale for applying an architectural language.

Keywords: Africa, Kinshasa, tropical modernism, concrete, steel

Streszczenie:

Uważana za jedno z najbardziej zaludnionych miast na kontynencie afrykańskim, Kinszasa ma stosunkowo krótką historię. Badanie ma na celu przenalizowanie metamorfozy małych wiosek, skupionych wokół wspólnego rynku, w nowoczesne miasto, w którego planowanie zaangażowali się urbaniści i architekci połączeni chęcią stworzenia metropolii. Poprzez metodę jakościową opartą na analizie literatury badane są role betonu i stali jako kwintesencji tropikalnego modernizmu. Prace C. Laurensa i E. Palumbo ukazują zasadność stosowania tu określonego języka architektonicznego.

Słowa kluczowe: Afryka, Kinszasa, tropikalny modernizm, beton, stal

1. INTRODUCTION

The arrival of the first Europeans in the Congo brought about a significant change in the architectural landscape. Initially, they adopted the local style, living in huts made with mud and timber, buildings like those of indigenous populations. However, the different climates and health conditions posed challenges. From the 1950s, the Belgian Congo experienced a vibrant period in construction, with several European architects making notable contributions among the key figures Marcel Lambrich, René Schoentjes, Paul Dequeker, Eugène Palumbo, and Claude Laurens. The adopted architectural trend, known as tropical modernism, was primarily influenced by the construction of large administrative, religious, and

school buildings. The architects used this language to conceive the construction of elaborate public buildings, showcasing outstanding achievements influenced by the contribution of new materials and techniques. Reinforced concrete and steel emerged as the main catalysts for reform in the construction sector, triggering the establishment of production plants in the Congolese capital and significantly reducing overall time and costs. The equatorial country also hosted ETERNIT's first asbestos elements industry, marking a significant milestone in using prefabricated architectural materials. With its rich and diverse influences, this unique historical context sets the stage for the architectural transformation in Kinshasa, invoking a sense of respect and admiration for the city's journey. In 1960, Belgian architects left the country mainly because of the unrest linked to the civil wars. When calm returned in 1965 with the takeover of power by President Mobutu, they were gradually replaced by other nationalities. Mobutism influenced various art forms, leading to the insertion of mosaics and frescos that depicted scenes of day life in precolonial Congo to recall local traditions and the typical decorative *apparatus* of buildings.[1] Moreover, Congolese architects associated with Europeans have also integrated works of art into their architecture as a mark of "authenticity" and assigning a more organic shape to the projects. The research proposes the analysis of two projects realised by Claude Laurens and two by Eugene Palumbo, retrieving the way modern construction materials, concrete and steel, were adopted to shape the future.

1.1. TROPICAL MODERNISM

The 1950s were characterised by tropical modernism in many African countries. We can notably cite the achievements of Maxwell Fry and Jane Drew in West African countries. A conference on tropical architecture was held in London in 1953,[2] marking the constitution of an architectural language adapted to the overseas areas. It will be theorised through a publication in 1956 in its first version, *Tropical Architecture in the Humid Areas*, and allowed the establishment of a specialised school, the "Architectural Association" in London. In Belgian magazines like Rythme, there were also recommendations for tropical design until the end of the 1950s,[3] such as with articles titled: *Living Conditions and Physical Factors to Which Homes in the Belgian Congo Must Respond*,[4] *Protection Against Solar Rays*[5] or *Building in the Tropics*.[6] Magazines were published with other examples illustrating the applications in buildings in different colonies, like that of Antonin Raymond in India.

Tropical modernism relies on a few precise rules: orientation of the east-west central axis, natural cross ventilation, and adequate sun protection on the most exposed building sides. Le Corbusier can be considered the first to experiment with brise soleil with concrete in Tunisian projects empirically. The *Maison Locative Ponsik* building is on slopy land parallel to the

[1] J. Lagae, K. De Raedt, *Building for "l'Authenticité": Eugène Palumbo and the Architecture of Mobutu's Congo*, "Journal of Architectural Education" 2014, no. 68(2), pp. 178–189. DOI: 10.1080/10464883.2014.937235.

[2] H. le Roux, O. Uduku, *The media and the modern movement in Nigeria and the Gold Coast*, "Journal of Contemporary African Art" 2004, no. 19, pp. 46–49.

[3] E. Scaillon, *Le centre culturel et le climat de Léopoldville*, "Rythme" 1968, no. 29, pp. 22–23.

[4] E.J. Devroey, *Conditions de vie et facteurs physiques auxquels doivent répondre les habitations au Congo belge*, "Rythme" 1949, no. 6, pp. 13–14.

[5] C. van Loo, *Protections contre les rayons solaires*, "Rythme" 1949, no. 6, pp. 18–20.

[6] C.M. Atkinson, *Construire sous les tropiques*, "Rythme" 1950, no. 8, pp. 34–35.

valley and should be built on *pilotis*, thus leaving the ground floor free. This way, the citizens will have an unobstructed view of the sea. Each duplex apartment was protected by installing "brise-soleil" elements on the south facade, thus protecting the indoor spaces from the daily sun heating. On the other hand, the east and west elevations were almost blind, so the apartments could not be exposed to the morning and late afternoon sun. The "brise-soleil" will become one of tropical modernism's quintessential elements and features.

2. METHODOLOGY

A qualitative analysis has enabled the identification of the critical aspects of C. Laurens and E. Palumbo's construction work in Congo, which used mainly concrete and steel. In the first half of 2023, the author visited the targeted buildings and assessed the state of the infrastructure. Visiting the area allowed a physical assessment and data collection through sketches and photos. However, analysing documents such as government reports or archives was challenging. The limited number of academic studies, press articles, or relevant previous publications has pushed the authors to rely on the data collected. Based on the current state of the targeted buildings, the analysis focused on the typological morphological and constructive aspects, highlighting an exhaustive diagnosis of them and their relationships with their general environment as quintessential samples of the tropical modernism language.

3. FINDINGS AND DISCUSSION

These architects who arrive in Congo are young, generally recruited from Belgium by companies established in the colony for some time or International Organizations: Maurice Houyoux for the Banque du Congo Belge (BCB), Claude Strebelle for the Union minière du haut Katanga (UMHK), George Ricquier for the International Maritime Agency (AMI), Claude Laurens for the Société Anonyme Belge d'Exploitation de la Navigation Aérienne (SABENA) and Eugene Palumbo for the United Nations Educational, Scientific and Cultural Organization (UNESCO).

The "Sabena Towers" (1952–1954) and "Sabena Headquarters" (1954) by Claude Laurens and the "INBTP" (1961–1962) and the "Palais de Marbre" (1971–1972) by Eugene Palumbo and Tala Ngai are the projects selected for the following discussion. The chosen buildings represent specific typologies and functions: the tall and the low buildings hosting housing or public activities. A multistory building whose design recalls the Unite' d'Habitation of Le Corbusier, Sabena Towers, and a single villa on the top of the Binza Hill, Palais des Marbre, completely plaster with Italian marble; a long-span hall building in the city centre, Sabena Headquarters, and a linear educational complex, INBTP. Structurally, it represented a variety of solutions and options primarily adopted in the colony before and after the independence.

3.1. CLAUDE LAURENS

Claude Laurens was born in Paris in 1908. He grew up in an artistic atmosphere as the son of the famous French sculptor Henri Laurens. He rubbed shoulders with his father's friends, avant-garde artists such as Picasso, Braque, and Matisse, who admired African art. His

father's sculpture was cubist, and the links between cubism and Africa are no longer in doubt. But this is not the path that Claude will follow. In his entourage, there is also Le Corbusier, the great architect whose influence is inevitable.[7] Claude Laurens is among the pioneers in Congo and even Africa, and the first project on the continent of Fry and Drew dates from the same period, the mid-50s. Laurens predicted in 1953 that his "architecture will be truly Congolese; it will be beautiful because it is logical and well adapted to the special living conditions of modern people in Africa."[8] Meanwhile, Maurice Houyoux explains that "the only merit" of architects "called to modernise Congolese cities" is "to have brought to light" the traditional way of building.[9] In 1963, Udo Kultermann addressed the question of architecture in Africa in his book *Neues Bauen in Afrika* (New Architecture in Africa), which is only mentioned in the chapter dedicated to Belgian Congo, the achievements of Claude Laurens.[10] Claude Laurens designed his buildings with the vision of inventing an architecture that would be genuinely Congolese. He starts with the same parameters as traditional architecture, merging them with the data learned in Europe. Consequently, he arrived at the same results, thus confirming that his architecture respects the identity of the place. Moreover, by learning architecture in the offices, the influence of the architects with whom they worked is a certainty. In his training experience, he worked with Le Corbusier, who introduced Laurens to the Brazilian modernists. They serve as a case study and a pretext for addressing the evolution of adapting architecture to the climate and environment and tropical modernism as critical regionalism. "In the Belgian Congo," he said, "as in other tropical regions of the globe, the architect trained in Europe finds himself faced with conditions very different from those of countries with a temperate climate."[11] This observation should push an excellent architect to change his conception; it is necessary to rethink the architectural problem and create something new for this new country if he wants to fully fulfil his role as an architect and accomplish logical and lasting work.

3.2. THE SABENA TOWERS

The Sabena Towers remain today one of the best modernist achievements of tropical buildings in Kinshasa. In the 1940s, particularly after the Second World War, architects' knowledge of the tropical climate was consolidated, and the Belgian Congo launched a major construction program to make Leopoldville a large city. As mentioned, Claude Laurens was flattered by Le Corbusian and Brazilian architecture and became the symbol of tropical modernism, with around thirty projects built in Congo. To house its workers, SABENA decided to build multistorey apartment buildings along the main boulevard of the capital city (Ill. 1). Experiments by Victor Olgyay on the optimum shape show that the rectangular parallelepiped is ideal for

[7] A. van Loo, *Dictionnaire de l'architecture en Belgique: de 1830 à nos jours*, Fonds Mercator, Anvers 2003, pp. 56–59.

[8] C. Laurens, *Deux immeubles hauts à Léopoldville, Congo Belge*, "Architecture d'aujourd'hui" 1953, no. 28, pp. 22–23.

[9] M. Houyoux-Diongre, *Grandeurs et servitudes de l'architecture en pays tropicaux. Une interview avec M. Houyoux-Diongre*, "Objectif" 1955, no. 9, pp. 8–15.

[10] C. Laurens, *Vers une nouvelle architecture au Congo*, "Bulletin de l'Union des Femmes Coloniales" 1953, no. 141, pp. 35–37.

[11] C. Laurens, *Deux immeubles…*, *op. cit.*, pp. 22–23.

Ill. 1. View from "Boulevard du 30 Juin" of one of the two Sabena Tower by Claude Laurens, source: Victor Bay, 2022.

tropical buildings. The long facades should be north-south and the shorter ones east-west. The apparent reason is that the exposed surface makes the most heated surface, i.e., the roof, smaller.[12] In terms of ratio, the flat roof that receives the sun's rays is heated more than all other surfaces combined. In his architecture, the sunshades become decorative elements that provide a particular graphic design and make tropical architecture an authentic style. In the towers, the vertical elements punctuate the façade and carry a few inclined horizontal sunshades to respect the constraint of letting air pass through and blocking the sun (Ill. 2). The architect justifies this choice: "As much as possible, the sunshades protecting the façades exposed to a large number of hours of sunlight are mobile and composed of thin sheets of aluminium to avoid heat storage."[13] He oriented the two towers strictly with the cardinal points, with the main elevations facing north and south, elevating them on pilotis like the typical central African granaries. Laurens explains that "the free ground floor allows air circulation to occur normally and even creates a current of air from the cold to the warm facades."[14] When Laurens builds, there are already many construction companies, and pouring the

[12] V. Olgyay, *Design with climate: Bioclimatic approach to architectural regionalism*, Princeton University Press, Princeton 1963.

[13] C. Laurens, *Immeubles à Léopoldville*, "Rythme" 1957, pp. 25–28.

[14] J. Lagae, C. Laurens, *Claude Laurens architecture: projets et réalisations de 1934 à 1971*, Universiteit Gent, Gent 2001.

concrete on site is easy. He demonstrates this with the pilotis, translating all the audacity and freedom of forms that concrete can allow. He makes his entire structure out of it before using other filling materials.

Ill. 2. Detail of the North and South elevations of the Sabena towers, source: Victor Bay, 2022.

3.3. THE SABENA HEADQUARTERS

In 1954, Laurens completed the construction of the Sabena Headquarters on the Avenue du Port, which also functioned as a check-in before reaching the airport. The two-story building is characterised by a long-span main hall with a mezzanine for the administration offices. The concrete structure plastered with local quartz stone panels is completed on the main elevation by a metal frame supporting the turntable vertical brise soleil in painted blue aluminium (Ill. 3).

3.4. EUGENE PALUMBO

Recruited by UNESCO at the Congolese government's request, Palumbo, like many other experts recruited by the international organisation, has a long history in Africa, specifically Congo. Educated in Milan and Lausanne, where he obtained diplomas in topography and architecture, he came to the Congo for the first time in 1952 after having acquired nine years of experience in construction in Italy. His first task in a tropical country was to draw up plans for workers' housing for the personnel employed in the construction of the large dams of Zongo in the Inkisi Province and Bendera in the Kiymbi Province. In 1959, Palumbo left for Switzerland, where he worked for two years on school construction before returning to Leopoldville in August 1962.[15]

[15] G. Fullerton, *L'Unesco au Congo,* UNESCO, Paris 1964, pp. 23–24.

Ill. 3. View from "Avenue du Port" of the Sabena Headquarters, source: Leopoldville 1950s – Tropical Modernism sets the tone [in:] Kinshasa Then and Now, 15.08.2011, https://kosubaawate.blogspot.com/search?q=sabena (access: 2.06.2024).

With the help of UNESCO, the government launched a national emergency programme to increase the number of secondary school pupils. The results were impressive. Total enrolment rose from 28,900 in 1959–1960 to 54,000 in 1961–1962, 73,000 in 1962–1963 and about 90,000 in 1963–1964.

Nicknamed the "flying builder," he travelled even more than the members of the travelling teams; Architecture is not a sedentary profession for him. In five months, at the beginning of 1963, he travelled nearly 40,000 kilometres, from one end of the Congo to the other, to supervise the execution of an ambitious school construction program. With the help of only two drafters, Mr. Palumbo prepares preliminary projects, final plans, and complete work plans for all the construction projects. He establishes the descriptive and estimated specifications, selects contractors, and helps them find the needed materials. Finally, he supervises the construction work from start to finish. Palumbo, joined by internationally trained Congolese architects, primarily Fernand Tala-Ngai, was introduced to the design project artworks representing an essential aspect of Mobutu's *authenticité*.[16] Further, the buildings and artworks discussed in this chapter were all, in one way or another, used to promote an idea of the new nation: a further echo of Art Nouveau energies. As Mobutu's grand overriding project edges towards outright totalitarianism, its aesthetics reveal a further development in the urge to essentialise and revivify narratives about the past. This decorative aspect, laid over the straight lines and right angles of modernist rationalism (often all in the same building), may also be seen as playful individuation. However, in Kinshasa, unlike Niemeyer's Brasilia, these tend to define the personality of a particular building rather than that of the city or the architect concerned.

[16] J. Lagae, K. De Raedt, *op. cit*., pp. 178–189.

3.5. INBTP COMPLEX

The National Institute of Building and Civil Works (INBTP) is a magnificent educational building complex which combines construction and site into a harmonious whole. From the buildings on a high hill in the residential suburb of Binza, there are excellent views all around, including Lovanium University to the east, Kinshasa and Brazzaville to the west and north. The institute's overall plan is constituted by an auditorium connected to the administration block (Ill. 4), which functions as a pivotal element within the classroom's wing. The dorm is in front of this construction (Ill. 5).

Ill. 4. View of the Administration block of the INBTP Complex in Kinshasa by Eugene Palumbo, source: Victor Bay, 2024.

Ill. 5. View of the dormitory wing of the INBTP Complex, source: Victor Bay, 2024.

With no money to pay for luxury amenities like air conditioning, Palumbo does everything he can to keep the interiors cool by using heat-insulating materials and sun-shading devices, providing ample ventilation, and orienting the buildings to maximise shade and wind. The modest budget rules out any added ornamentation, but Mr. Palumbo does not regret it. According to Palumbo, the beauty of the building lies in its structure, which serves as a decorative element combined with the composition of light and shadow or the alternation of full and empty spaces.

The reinforced concrete frame structure is primarily used to achieve proper educational spaces in the studio atelier area, whereas, in the auditorium, they came up with a steel profile structure to limit the number of intermediate supports (Ill. 6). The clay bricks were used to fill the walls and for the perforated elevations.

Ill. 6. Interior view of the auditorium of the INBTP Complex, source: Victor Bay, 2024.

3.6. CLAUDE LAURENS

Located on a hill in the commune of Ngaliema, in the "Ma Campagne" district, the "Palais de Marbre" was designed by Palumbo and Tala-Ngai in the early 1970s for the director of the Central Bank before being requisitioned by Mobutu to receive distinguished guests of the Republic. The name refers to the entire building covered with marble imported from Italy. The plan view recalls a typical courtyard structure in a circular shape (Ill. 7), and the different housing spaces overlook both the centre of the Palais and radially various points of view in the surrounding landscape (Ill. 8).

Ill. 7. View of the inner circular court of the "Palais de Marbre" by Eugene Palumbo, source: Victor Bay, 2024.

Ill. 8. Exterior view of the "Palais de Marbre" by Eugene Palumbo, source: Victor Bay, 2024.

4. CONCLUSIONS

Nowadays, Kinshasa is experiencing a savage urban sprawl that has radically changed its identity. Nevertheless, the projects presented by Claude Laurens and Eugene Palumbo remain "permanences," monuments of the recent past. The lessons of sustainability embedded into these case studies shall bring the architects and scholars to reflect on the legacy provided by the Modern Movement legacy. Tropical Modernism was not only the epiphany of an adaptation to the context, forcing the architects to confront local tradition and climate, but more practical research of an architectural language able to express, especially after the Independence, the

rebirth of a country. A renewed identity that stands physically and metaphysically on concrete and steel structures was completed using locally produced stone tiles, clay bricks, or imported marble. The ongoing phenomenon of "Dubaisation" in most African capital cities compromises the work done by the last century professionals on contextualising the architecture, reducing the project to a concrete structure wrapped by a glazed curtain wall that is heavily climatised. The local construction industry also pays a high price as the hyper-technological materials must be imported abroad. Moreover, another issue in the last decades concerns the classification of the "permanences" as heritage. This heritage has to be preserved and protected.

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