

# Identification of the Abderrahmane Bouchama's Architectural Approach Assessed by the Semiotic Model in the Algerian Post-Independence Architecture

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## Abstract

Islamic architecture is among the most significant architectural trends favored by Algerian authorities since the independence of the country in 1962. Numerous official buildings in the capital Algiers illustrate authentic "Algerian architecture", derived from the pre-colonial Heritage. Our study aims to produce a matrix for the Islamic referents, showcased in the façades designed by Abderrahmane Bouchama, a leading figure of this trend. To achieve this goal, we resorted to a semiotic investigation of the facades of two of Bouchama's notorious buildings: the headquarters of the Birkhadem National Archives, and the Caroubier University of Islamic Sciences (Algiers). By applying the Levy-Spigai Analysis framework to our case studies, we were able to determine the architectural Islamic components used in Bouchama's architecture. The main purpose of our study is to edit a set of architectural and aesthetic rules as a guidance, providing a normative design guide to Algerian architects.

**Keywords:** Islamic architecture; post-independence period; Abderrahmane Bouchama; Architectural and aesthetic features; Semiotic analysis.

## Introduction

Algeria's independence in 1962 marked its transition from a colony to a nation-state. The young nation sought to affirm its sovereignty (and break from colonial authorities) through the major architectural projects that multiplied since then. This initiative cemented Algeria's aspiration to embrace «the modernity and age of science, technology, industrialization, and cultural evolution» (Oulebsir et al., 2003).

Among the plethora of architects who carried out their projects, a few engaged in a quest for an Algerian authentic architecture, rooted in its culture and heritage. One architect, Abderrahmane Bouchama, the only Algerian architect at the time, was the forefront of the movement which expressed the necessity to reconnect with Algerian culture, that of the prestigious past of Islamic dynasties (Zerrouki, 2021).

Abderrahmane Bouchama's journey is reflective of that of Algerian identity: repressed during the French colonization, and strongly present in post-independence architecture (Bertaud du Chazaud & Bertaud du Chazaud, 2023; ). His efforts initially received limited support, but the "Arabic-Muslim" style debate gained traction between 2013 and 2017, showcasing its aesthetic orientations in recent official buildings (Chérif, 2017; Djermoune, 2017).

In contemporary Algeria, the master builders, architects, and designers commonly introduce into their architectural and constructive practice in the public and private sectors, architectural elements drawn from the traditional or local Maghribi and specifically from an Algerian architectural repertoire. However, this time period remains inadequately investigated, despite the abundance of study material (Zerrouki, 2021). The projects multiply, and successful interpretations of said referents can only be achieved through extensive historical knowledge.

That being said, the ain façades of notorious official buildings can provide various clues regarding their composition, and even their meaning. Therefore, our contribution consists of exploring Bouchama's architecture, using a semiotic interpretative framework, in order to provide a normative design guide to Algerian architects.

## Post-independence Algeria: a historic context

Algeria's decolonization wasn't merely the act of retrieving a land occupied by the French colonizer for over a century. The independence achieved in 1962, in the aftermath of a protracted and violent struggle, was a turning point in Algeria's contemporary history, as it marked its transition from colony to nation. It fulfilled the Algeria people's aspiration to relish in an egalitarian society and to regain the control over their country's resources (Bertaud du Chazaud & Bertaud du Chazaud, 2023). They also aimed to recover their precolonial identity and culture, and endorsed the challenge of nation building, through the reuse of already-existing structures and creation of new scales that will no longer be used to separate and confine people, as described by Fanon (Adalet, 2022). Enterprises in which architecture played a major role.

To assert one's sovereignty implies distancing oneself from colonial regime, and everything it represents. Three occurrences in Algeria following independence were indicative of this ideology:

1. Seeking to erase all traces of the French colonizer, ranging from names of towns and villages (Frenchified or created by Colonists), streets and squares, which received Arab or Berber names, and those of the martyrs of the revolution. Jean-Jacques Deluz expressed his concern in his urban chronicle<sup>1</sup>, that this approach of erasing traces of memory should extend to architecture, which ended up only affecting religious buildings. Some of which were converted back into mosques (Ketchaoua Mosque) while others were repurposed (The cathedral of Oran transformed into a library)(Bertaud du Chazaud & Bertaud du Chazaud, 2023).
2. Algeria anchoring itself in sub-Saharan Africa, turning its back to Mediterranean Europe. It became the center of revolutionaries, liberation movements, and civil rights demands. Furthermore, Algiers was dubbed "Revolutionary Mecca" or "Capital of the Third World" by Amilcar Cabral<sup>2</sup>, during a press conference in Algiers in 1968 (Bertaud du Chazaud & Bertaud du Chazaud, 2023).
3. The debate between Modernity and tradition, related to the ideological and cultural content, arose in Post-independence Algeria's architecture.

Meanwhile, modern architecture offers countries of the Global south the ability to break away from the recent past and take an equal part in global architectural culture (James-Chakraborty, 2021; Aziz Amen, 2017; Aziz Amen & Nia, 2018; Ho et al., 2023 ). Therefore, the image of modernity that decision-makers wanted Algeria to reflect, was achieved by entrusting architecture and urban planning to the handful of foreign architects, who remained in Algeria after its independence (Roland Simounet, Jean Bossu, Georges Blancard de Lévy, Léon Claro, Georgette Cottin-Euziol, André Ravéreau and Jean-Jacques Deluz) as well as to "big names" in architecture (Oscar Niemeyer, Kenzo Tange ...). These architects implemented facilities and housing plans, in addition to university programs, in a time period where the Algerian architecture education system was lacking, with only two Algerian architects established. Moreover, the *École Polytechnique d'Architecture et d'Urbanisme* (Polytechnic School of Architecture and Urban Planning) (EPAU) graduates would only be operational in 1975. That being said, tradition, perceived as a brake to development by higher-ups, and despite its traces being almost completely erased by the French colonizer, provided a rich reference repertoire for architects such as Deluz, Ravéreau, Pouillon, Bouchama and many others.

Indeed, in order to produce an Architecture deeply rooted in a place, architects have to rely on "the use of locally available materials and the importance of nuanced responses to climate". Architecture, being the strong identity marker that it is, embodies and helps celebrate certain cultures (James-Chakraborty, 2021). Algerian architecture should therefore be, reflective of the multilayered cultural history of the country, and its numerous civilizations (Numidian, Phoenician, Roman, Arab, Turkish, Spanish, French ...).

Bouchama writes in this regard: "Of all the architectural contributions in this country, the most precious is certainly the one that Algerians themselves have kneaded with their hands over the centuries, in the plains or in the mountains, on the shores of the Mediterranean or on the borders of the Sahara", but would solely retain the prestigious Arab-Islamic era as a reference to "Algerian" architecture (Bertaud du Chazaud & Bertaud du Chazaud, 2023).

This approach probably stems from the need to feel legitimate and rebuild or rehabilitate an identity that has been overlooked for a long time. Identifying to a mono-cultural, almost extravagant identity, is a common trauma response in the countries who have experienced war: the greater the identity oppression, the more visible it is after independence. The integration of various identity components (namely those related to the French) is particularly delicate in the case of Algerian people. The identity elements chosen by their collective imaginary, and to which they identify, is that of the glorious Arab-Islamic era (Souici et al., 2021).

### **A brief recount of the Arab-Islamic era in Algeria**

One noteworthy fact, is the literature produced during this time period on Maghribi Islamic architecture, providing a coverage of the Mediterranean basin, and Algeria in particular. As a result, George Marçais' "Muslim Art" was released in 1962 after a string of publications that included: First, co-authored with his brother William, "The Arab monuments of Tlemcen" (1903); then, "Muslim Art Manual" (1926–1927); and last, "Muslim Architecture of the West" (1954)(CHIALI, 2012).

Notable accounts concerning Hispano-Moorish architecture, Muslim Spain, Western Muslim dynasties, and Muslim conquest in Algeria, including its cities and mosques, were published in the 1970s by Lucien Golvin and his disciple Rachid Bourouiba. Between 1973 and 1977, Bourouiba published "Muslim Religious Art in Algeria," and in 1979, Golvin published "Essay on Muslim Religious Architecture." Despite covering the same geographic

<sup>1</sup> Deluz J.J "Algiers: Urban Chronicle », 2001.

<sup>2</sup> A politician from Guinea-Bissau and Cape Verde.

area, the three renowned authors' approaches to Western art varied significantly (with Bourouiba drawing on Golvin's teaching)(CHIALI, 2012).

It is important to note that while these books have shed light on Algerian history and art during the Muslim era (spanning approximately 13 centuries), they were by no account the first one to do so. The general misconception about the medieval North African art as a replica and inferior to that of early Islamic Iraq, Egypt, and the Iberian Peninsula(Anderson, 2014), was first challenged by Duthois and Saladin, during the 19<sup>th</sup> century. Even while North African art is far less documented than Andalusian and Oriental art, it would soon be promoted to the status of Andalusian monuments after the previously mentioned 19th century French writers emphasized similar chronological moments in architectural history. The unification effort of the Almoravid (1040-1147), and Almohad (1172-1269), dynasties, which was followed by "a golden age" during the joint reign of the Nasrid dynasty of Grenada and the Abdelwadids of Tlemcen (late 15th century), are examples of shared history between the northern and southern banks of the Mediterranean (CHIALI, 2012).

Besides the documentation produced, Duthois' contribution will further extend to the study and the restoration of the monuments of Algeria. Commissioned in 1872 by the Commission of Historical Monuments, he would focus on the evolution of Muslim ornamentation in Tlemcen, in the department of Oran. He documented Algerian monuments, mainly mosques, and attempted restitution, such as the Mansourah mosque(CHIALI, 2012). He has demonstrated that this architecture is founded on geometric and mathematical concepts, which means that it was based on scientific principles and could be understood similarly to Western architecture. These findings would be later backed up by Marçais in 1905, and would, paired with a political will, lead to the creation of the Neo-Moorish architecture(Zerrouki, 2021).

Moreover, the monuments of Tlemcen were spared the destruction that occurred during the French colonization, yet, a few stand witness of what Jean-Jacques Deluz described as "authentic architecture expressing national truth". For instance, The Almoravid mosque of Nedromah (which Marçais claims to be the most ancient classified mosque in Algeria) and that of Algiers represent the only remnants of that dynasty (Zerrouki, 2021).

The intact integrity of these monuments and their geometric value, as supported by scientific evidence, may possibly account for Tlemcen's extensive historical repertoire, and its influence on Abderrahmane Bouchama and other post-independence Algerian architects.

### **Abderrahmane Bouchama (1906-1985): The architect and activist**

Despite being an Algerian architect of a French educational background (the École des Beaux-Arts in Paris and the Institut Polytechnique de Nantes graduate), the architect won't be granted any official commissions, due to his support for independence(Bertaud du Chazaud & Bertaud du Chazaud, 2023). His Architectural tendencies would be nevertheless, displayed during the colonization, in the Madersa "Dar El Hadith" in Tlemcen, of which he drew the plans between 1936 and 1937(Zerrouki, 2021).

Once Algeria achieved its independence, Bouchama, the only Algerian architect to have achieved professional status(Crane, 2008), was the first president of the Order of Algerian Architects, which he founded(Bertaud du Chazaud & Bertaud du Chazaud, 2023). He also reopened The School of Fine Arts in Algiers in 1963, bringing with the painter Bachir Yelles and Claro(Deluz, 1981).

After the independence, Abderrahmane Bouchama's ambition to restore an authentically Arab style(Deluz, 1981) will be echoed in the states cultural and ideological project. Indeed, the Arab-Muslim essence of the Algerian nation will soon be affirmed through the Charter of Algiers<sup>3</sup>. "Algeria is an Arab Muslim country", the document would state in 1964(Yelles, 2000).

His advocacy for a "national" architecture in the post-independence period would first be manifest in his pamphlet "The arch that sings" published by SNED in 1966(Bertaud du Chazaud & Bertaud du Chazaud, 2023) , before being displayed in his architecture. In this series of essays, where unequivocal praise was drawn of the Alhambra of Grenada, and the later Taj Mahal(Deluz, 1981), he argues that "formerly silenced and overlooked buildings would be made to sing, but only through a concerted process of reworking past forms and reinvesting them with new significance", referring to buildings of common Arab-Muslim origins(Crane, 2008). The Tlemcenian forms in this case, are the ones most infused with Andalusian influences(Deluz, 1981) .

He opposes "tradition" to modernism, as its critical alternative, and articulates broader regional and international ties to the "Arab-Islamic architecture". He declares that the new nation is part of this extensive heritage, in light of the prevailing discussions of pan-Arab and pan-African identity(Crane, 2008).

Other literary works would later follow ("Thinking Movements and Materials" (1968), The greatness of unity (1976), and "The giant Oasis" (1984)) (Chorfi, 2017), and his buildings will soon embody this theorization of the architect's tendencies and political positions, in the midst of the ideological discourses and cultural content of

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<sup>3</sup> The founding document of independent Algeria.

that period. Some would claim that his architecture is reminiscent of the “Jonnart” style, despite his rejection of the French colonial heritage(Bertaud du Chazaud & Bertaud du Chazaud, 2023), others that his architecture “offered up an almost caricatural set of references” in reference to his Islamic Institute of Caroubier. (Crane, 2019).

Still, his architecture appealed to the religious authorities, who commissioned him for mosques and Islamic institutes during the 1970’s. He thus built Islamic Institutes in Oran, Constantine, Tlemcen and Algiers. He also built in the suburbs of Algiers the mosques of Hydra, Bouloghine, El Biar (Fig.1) and Blida. During the 1980’s, he devoted his efforts to the construction of cultural and administrative buildings, such as the National Archives Centre and the Supreme Court in Algiers (1984) (Fig.2) , as well as the cultural centre in El Biar (1984)(Bertaud du Chazaud & Bertaud du Chazaud, 2023).

Despite his laudable efforts, Abderrahmane Bouchama’s endeavor received at the time little support from his peers(Chérif, 2017). However, the debate over architectural identity around the "Arabic-Muslim" style resurfacing. Through efforts dubbed "representative of the quest for identity," this speech gained traction between 2013 and 2017 in an attempt to defend the aesthetic orientations of the aforementioned style(Djermoune, 2017). For instance, numerous recent official buildings showcase this revived tendency (Fig.3). In the following sections, two of Bouchama’s most renowned buildings will be analyzed, to better understand his architectural orientations.



**Figure 1:** The Supreme Court of Algiers (Source: Maghreb voices website)



**Figure 2:** Mosque El Biar (Source: Wikipedia).



**Figure 3:** The Ministry of Religious Affairs, in the vicinity of the Islamic Institute (Algiers). (Source: Author).

## Methods

### 1. An Interpretative framework for the architectural text

In order to understand the architectural project, and therefore, the architect's approach, an interpretative analysis of the façades of the selected case studies has been carried out, with the aid of the tools supplemented by a semiotic theoretical model.

This framework stems from Hjelmslev's theory of language<sup>4</sup>(Spigai, 1992), which Greimas and the school of Paris would later adopt(Condotta, 2019). Hjelmslev defines a hierarchical semiotic model, in which the sign is expressed in terms of the opposition between content and expression, a transposition to Saussure's signified and signifier(CHIALI, 2012). To enable the interpretation of said levels, a second articulation is introduced as Form and substance. As a result, four general levels of language can be distinguished : Substance of Content (CS), Form of Content (CF), Substance of Expression (ES) and Form of Expression (EF) (Spigai, 1992), which will be referred to by their acronyms, for the sake of brevity.

In all forms of language, the tangible and material elements, in their raw, non-functional and unarticulated state, as perceived by our senses (sounds heard in verbal communication or letters observed in written communication), are the (SC). These elements are then structured according to the syntax and paradigms dictated by the language system (grammar and lexicon), also known as the (FE).

They also signify on a deeper level, as they are organized among themselves in a particular manner, to give way to spoken or written language (FC) This consists in the translation of the shapeless thought or concept, which is the very essence that languages mold according to their particular systems (SC). (CHIALI, 2012; Condotta, 2019). This theoretical model was later adapted by Spigai to the architectural text. He thus developed an operational framework in the context of research with Albert-Lévy<sup>5</sup>, explained in a "faceted taxonomy" (Condotta, 2019) (refer to table 1). This framework allows us not only to retrace the course of the architectural project carried out in the opposite direction (from the constructive elements constituting the project to the generating idea), but also to establish the foundations that accompany any new project, from its conception to its realization.

In this respect, (SE) refers to the tangible elements of the architectural text, or the materials chosen, with their visual and tactile characteristics. The latter are expressed in terms of opposition (texture, opacity, color...) and range in complexity. (FE) is the form of the project and it concerns the typical architectural structures, but also the geometry that generates and regulates the composition of the façade (primary forms, symmetries, rhythms and grids, contours...).

Delving to the deeper level of the content, the (FC) concerns the "functional typology" between the representative parts of the content, which can also be understood by means of oppositions of meaning or localization. The idea of the project is thus transformed into a three-dimensional text. The (SC), also called the "conceptual substance", is the most intrinsic, latent or implicit matter of the architectural text. It manifests itself in the "philosophical, political-social, ethical, religious, historical-cultural, symbolic-metaphorical core", as well as, although less significantly, in the typological, functional and distributive levels of the project programs.

<sup>4</sup> "Prolegomena to a Theory of Language", 1961, Written and first published in Danish in 1943, and later translated into English, then to French.

<sup>5</sup> "Semiotics of Space: Sacred Classical Architecture", 3rd cycle thesis, 1979.(Levy, 1979)

## 2. Case studies

In this article, the façades of two of Bouchama's well renowned projects in the capital Algiers have been chosen as case studies:

### 2.1. The Caroubier University of Islamic Sciences

The faculty was constructed in the outskirts of Algiers in Hussein Dey between 1972 and 1977 (Fig 5). It is prominently situated on the main highway that connects with the city center (Crane, 2019). The project is designed as a follow up of the Islamic institutes of Constantine (1969) and Tlemcen<sup>6</sup> (1970), credited to Bouchama<sup>7</sup>. Originally, the Islamic Institute of Algiers was a component of a complex whose master plan was established in 1972. The initial concept included, besides a university and a high school, a mosque, a school for Arab language, a secondary school, and accommodations for both students and faculty<sup>8</sup>. However, only the high school (which later became the Islamic institute) was built (Fig.4) (Bouchama, 1980).

### 2.2. The headquarters of the Birkhadem National Archives

It is a public administrative organization with a focus on culture and science. The architect Abderrahmane Bouchama, who previously designed the Institute of Social Sciences of the University of Algiers (Caroubier campus), was given the task of designing it in 1981 by the Presidency of the Republic. Decree No. 87-41 on January 6, 1987 established the National Archives Birkhadem's headquarters and placed the center under the Minister of Culture's direction. This 70,000 square meter structure was created with archive preservation and international standards in mind. It is situated in Birkhadem, in the southern suburbs of Algiers, on Hassan Bennamane Street (Akbal, 2014; BENSELLAM, 2011).

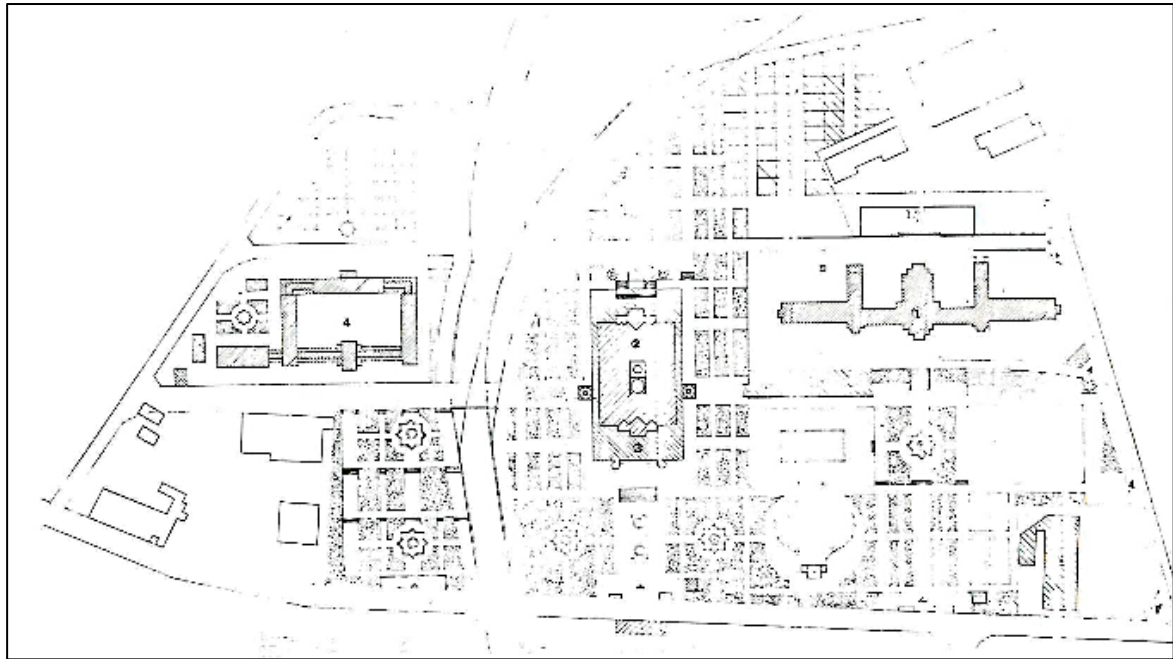
**Table 1:** A semiotic framework, Based on Spigai's and Condotta's work. Source: Author.

LEVEL OF CONTENTS	Content Substance (CS)	<ul style="list-style-type: none"> <li>- Philosophical core.</li> <li>- Ideological-social meaning.</li> <li>- Historical-cultural denotation.</li> <li>- Symbolic-metaphorical substance</li> <li>- Typological aspects.</li> <li>- Functional needs</li> </ul>	Manifestation : Main facade
	Content Form (CF)	Conceptual topology, interpreted as: <ul style="list-style-type: none"> <li>- Opposition in meaning: (serving/ served); (imposing/ unimposing); spaces ...</li> <li>- Opposition in location: (high/Low); (open/closed); (central/ peripheral)</li> </ul>	
LEVEL OF EXPRESSION	Expression Form (EF)	Geometry : <ul style="list-style-type: none"> <li>- Euclidean geometry primary shapes.</li> <li>- Symmetries.</li> <li>- Rythms (protruding and recessed volumes, interplay of solids and voids).</li> <li>- Patterns, tracing and grids.</li> <li>- Outlines and contours.</li> </ul>	
	Expression Substance (ES)	<ul style="list-style-type: none"> <li>- Structural and Tectonic quality: constructive and architectural elements.</li> <li>- Plastic quality: material substance of afore mentioned elements, chiaroscuro and texture.</li> <li>- Chromatic quality: colors, shades ...</li> </ul>	

<sup>6</sup> Constantine and Tlemcen are two major Algerian cities, situated to the east and west of the capital Algiers respectively.

<sup>7</sup> <https://archialg.hypotheses.org/322>

<sup>8</sup> <https://www.archnet.org/sites/309>



**Figure 4:** The original master plan of the Islamic complex of Caroubier, showing the faculty of Islamic sciences (1). source: (Bouchama;1980).



**Figure 5:** The Caroubier University of Islamic Sciences (Source: Author)



**Figure 6:** The Headquarters of the National Archives (Source: Author).

## Results and discussion

The following section is divided into two parts. Firstly, we will highlight the findings generated from the framework, applied to both case studies. These results are shown in tables (2) to (6), and presented from the outermost to the innermost matter of the architectural text. The Expression substance (ES), featured first, will be therefore followed by the Expression form (EF), then by the Content form (CF), and finally by the Content Substance (CS). Secondly, an interpretation of these findings would follow.

### 1.1. The Caroubier University of Islamic Sciences

The building appears quite eye-catching with its monumental aspect, where the horizontality of the overall architectural body is “punctuated” by protruding units on either side of a central, imposing one, flanked by two minaret-like towers on either side of it. Beginning with the (Expression substance), Blocks A and B’s pyramid hip roofs and the minaret-like towers’ octagonal cupolas provide a contrast to the recessed blocks’ flat floors. The materials used (Tiles/Concrete) additionally offer a contrast in terms of color and texture (polished green tiles against rough white walls). These same walls are adorned with ceramic in various forms (frames, merlons, decorative tiles) as to outline the significant tectonic components of the façade, by their contrasting plastic and chromatic attributes (rough and monochrome / Smooth and polychrome). The constructive architectural components, along with their ornaments, form a harmonious and proportionate ensemble (Expression form), where the symmetries (primary and secondary) add to the overall stability of the building.

A set of cues (Content form) can be used to identify the functional aspect, where visually dominant blocks (A and B) are associated with important functions. This distinction is indicated by oppositions in terms of (protruding, dynamic, high, open, and variable) blocks against the (recessed, flat, low, relatively closed and monotonous) intermediate units. Examples of these oppositions include the interplay of protruding and recessed volumes, changing roofing outlines, and variations in window sizes. The arrangement of the aforementioned components and the concept they represent (Content substance) are all examples of how decorations provide the building character and visual clues. According to Bouchama, who claims that the Islamic Institute of Caroubier is an excellent example of a “pleasant” architecture, the decorative elements are inspired by Arab-Islamic abstract art. An architecture whose “heavy decorations” are still in style today. (Bouchama, 1980).

### 1.2. The headquarters of the Birkhadem National Archives

Starting with the materials chosen (Expression substance) it has been observed that the light neutral opaque exterior walls contrast with the dark transparent windows. The roughness and plainness of the material used (plaster coating) make the smooth marble-cladded panels and tiles stand out. The interior wall of the main porch (Iwan) showcases an opposition between the colorful polished ceramic, with floral themes, and the muted colored walls, chiseled with geometric ornaments. The shades highlight the architectural components of the façade, and the building’s post and beam structure and flat floors, which provide the blocks’ tectonic stability, add to the building’s overall harmonious and stable appearance (Expression form). The symmetries emphasize the functionally significant blocks, and confer to the main entrance a monumentality and an imposing aspect. (Exterior contours)

Furthermore, the position and organization of the different units of the building (Form of content) reflects the significance and purpose assigned to each one of them, in line with the generating concept of the project (Content substance). Consequently, a change in aspect and position—from periphery, unimposing, undecorous, and relatively closed (with smaller windows) to central, imposing, decorous, and open (with a large arch and large windows)—indicates a shift in function (served/serving spaces) and target audience (staff/visitors). Together with these distributive and functional elements of the architectural program, ornamental repertoires serve as visual cues that suggest an early-stage design decision made by the architect. In fact, one way to establish an Algerian architectural identity in one of the state’s institutions is to include features of Islamic architecture.

An appropriate way to understand the findings regarding (Expression form and substance) would be to compare architecture to music. It is true that certain terms and expressions—like harmony, movement, interval, time, and nuances—adapt to the various contexts in which they are used. This lexicon is shared by the sound context (music) and the visual context (architecture) (Riopel, 2012).

Therefore, the rhythm in the façade of the Islamic institute (2a,a,2a,a ...) and of the National Archive (a,3a,a,3a...)(refer to tables 3 and 5 respectively), could be expressed as the (1,2,1,2,1,2) count in music, with the regular intervals being (void, solid, void, solid ...).

Lakeman, for his part, identifies eight musical elements that can be expressed in architecture: pitch (frequency, represented in horizontal lines, corresponding to the different ceiling heights in the building); tempo (vertical lines of the structural grid); Harmony (proportion between the floor and the walls); intervals (ratio of spaces); melody (a curve that displays the change in volume); Rhythm (dependent on to the openings’ size and position); scale (colors); and dynamics (Elevation changes) (Lakeman, 2018).



Likewise, Pitch refers to the ceilings' heights of both buildings. Tempo is the structural grid and the openings' axis, which combined with pitch, produce a melody. The Islamic Institute's towers, which resemble minarets, and the Archive building's main entrance both display an increase in volume. Intervals are the ratios of the geometric forms in both buildings (refer to tables 3 and 5, geometry), and the dynamics make out the silhouettes of both building, with their ascending and descending slopes.

Both buildings exhibit symmetry, which is synonymous to balance in a building(Zevi, 1959). As a result, two minarets (rather than the single minaret typical of Algerian architecture are seen on either side of the entrance(Deluz, 1981)) draw the attention, and are accentuated by their height in the Islamic institute. The Contrast is evident in the way that openings (solids and voids) and protruding and recessed volumes interact to make both buildings "come alive". The use of straight lines provides the buildings their rigidity, and the proportions of the geometric shapes add to their harmony (Zevi, 1959).

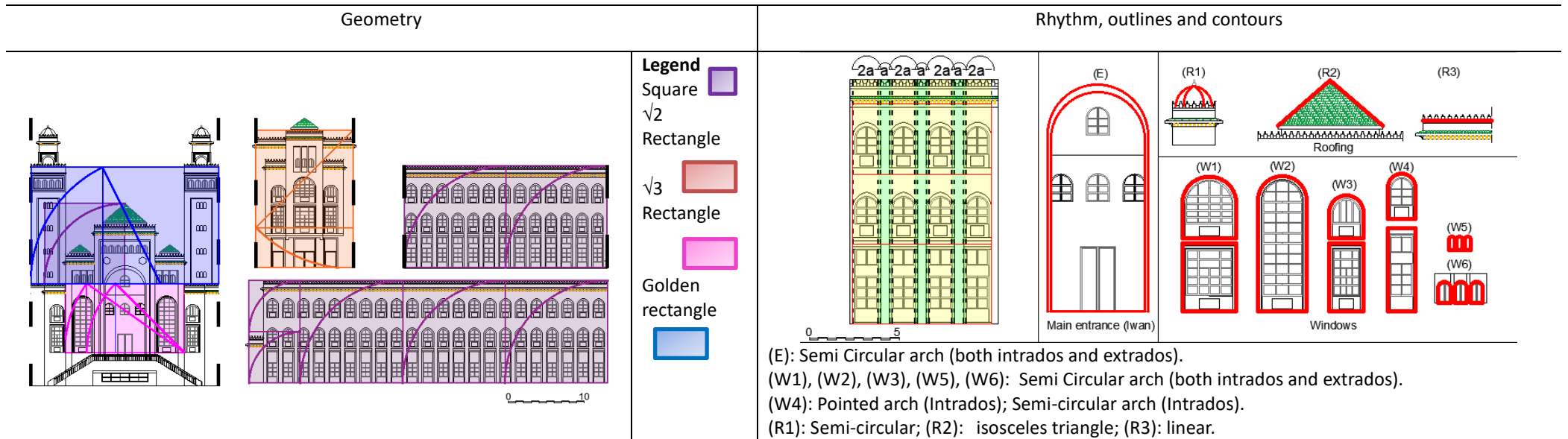
Through their aesthetic, which gives them their "character," both buildings convey the architect's opinions on Algerian identity and architecture(Zevi, 1959). The usage of a monumental Iwan for the entrance is observed in both case studies (see tables 2 and 4). This architectural form is likely to be inspired from the Taj Mahal( Bertaud du Chazaud & Bertaud du Chazaud, 2023), one of Bouchama's inspirations. This further supports the architect's belief that Islamic architecture referents are universal. Furthermore, the vertically aligned windows, topped by pointed arches in the Islamic institute are symbolic feature of the Islamic aesthetic of the façade. Indeed, Islamic architecture typically uses arches in regular repetition rhythms, which can be seen in the rhythm of the arcades or the opening of Islamic facades (HASSAN, 2023).

Bouchama's architecture also features elements which are typical to the Algerian Islamic architecture, which can be found in the roofing (pyramid hip, copulas, flat roofs), the minarets, the materials used (ceramic, tiles) and in ornament to name a few. These are some of the significant components of the Algerian Islamic architecture, that were identified by the three renown aforementioned authors: the Marçais brothers, Golvin and Bourouiba. Their different approaches were synthesized by Chiali by diagrams in his thesis(CHIALI, 2012).

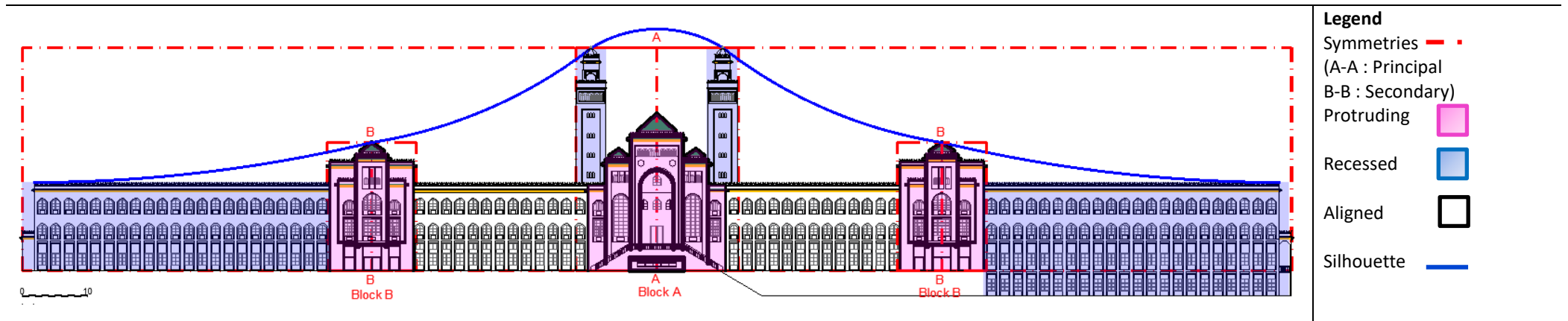
**Table 2.LEVEL OF EXPRESSION: Expression Substance (ES)**

Tectonic quality			Plastic quality	
			Materials	
			<p>Armed concrete/ bricks</p>	<p>Tiles</p>
			<p>Ceramic</p>	<p>Wood/ Glass/ Iron.</p>
			Textures	
			<p>Rough</p>	<p>Smooth</p>
Chromatic quality				
Shades	Light		Dark	
Color palette				
Opacity (material)	Opaque		Transparent	
			Monochrome	Polychrome
			Exteriors Walls (Uniform)	Ceramic panels
			Roofs and cupolas	Windows Frames
			Corbels	Merlons

**Table 3.LEVEL OF EXPRESSION: Expression Form (EF)**



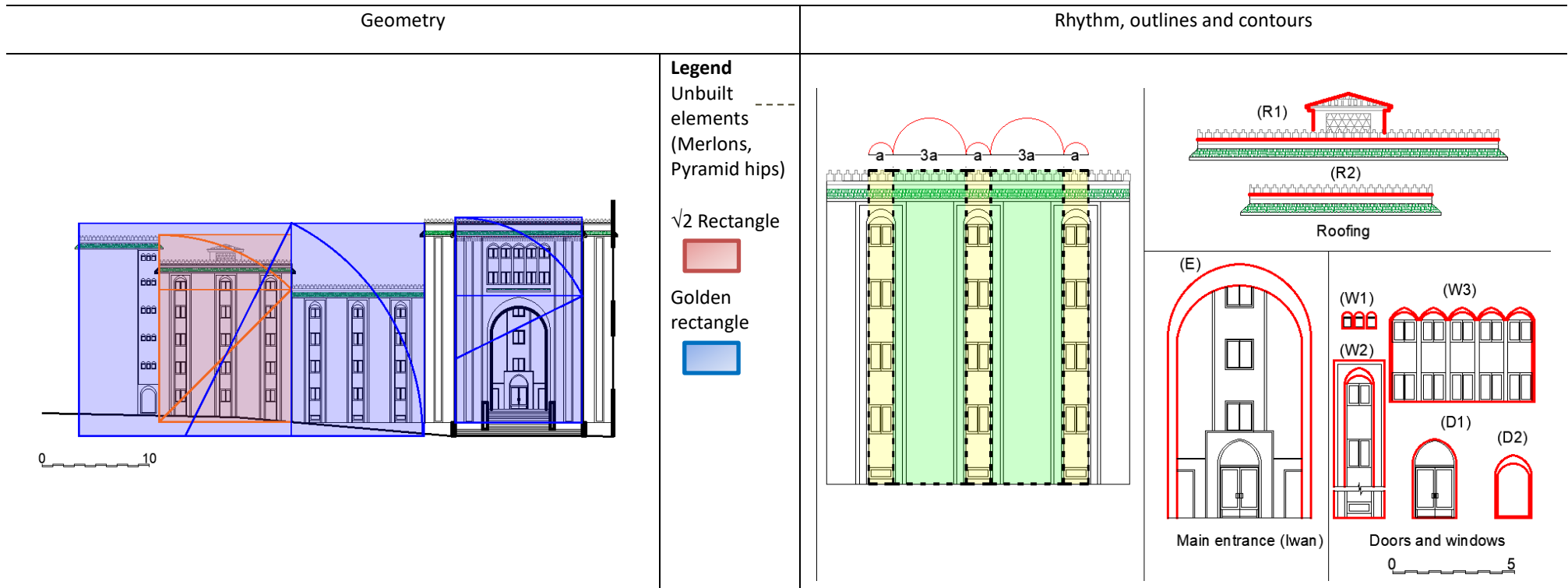
Symmetries and volumes



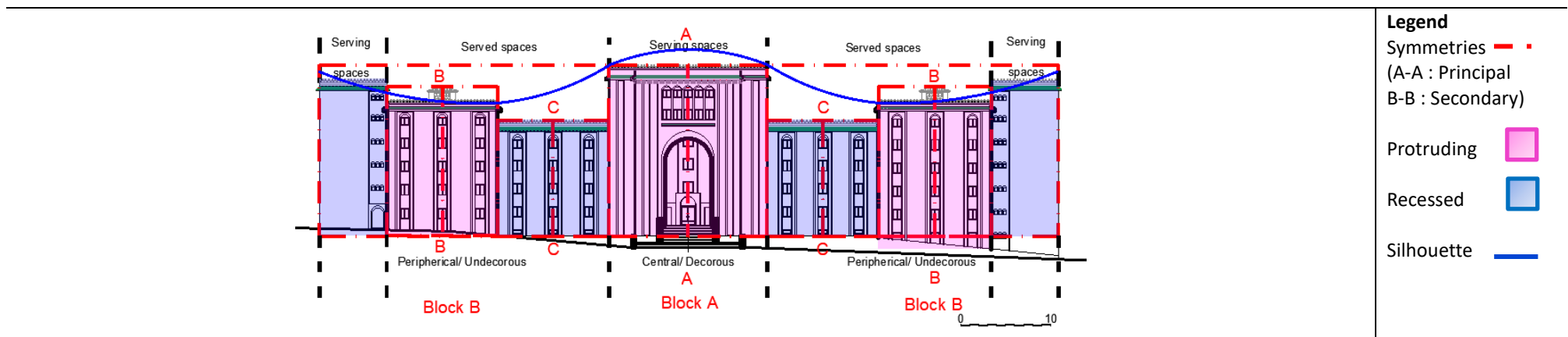
**Table 4.LEVEL OF EXPRESSION: Expression Substance (ES)**

Tectonic quality			Plastic quality		
			Materials		
			Armed concrete and standard brick walls		
			Tiles	Marble	
Ceramic	Plaster (haut relief)				
			Textures		
			Rough	Smooth	
Chiseled	Polished				
Chromatic quality					
Shades	Light		Dark		
Color palette					
Opacity (material)	Opaque		Transparent		
			Monochrome	Polychrome	
			Exterior walls (Uniform)	Ceramic panels	
			Tiles	Marble cladding	
			Frames	Decorated panels	

**Table 5.LEVEL OF EXPRESSION: Expression Form (EF)**



Symmetries and volumes



e

(E): (extrados : drop arch, soffit : segmented arch).

(W1), (W2), (W3), (D1), (D2): false arche (extrados : drop arch, and soffit: segmented arch).

(W4): Pointed arch (Intrados); Semi-circular arch (Intrados).

(R1): isosceles triangle; (R2): linear.

The table below represents the elements identified by the three authors combined, based on Chiali’s work.

**Table 2:** Significant elements of Algerian architecture, as defined by Marçais, Golvin and Bourouiba (Source: Author).

Materials	Architectural masses	Style/ Ornament				
		Materials	Decorative forms	Decorative ensembles	Minarets decoration	Decorative elements
Stones	Support bodies: Columns, Pillars, arches ...	Materials	Decorative forms	Decorative ensembles	Minarets decoration	Decorative elements
Bricks		Bricks	Columns and capitals	Mihrabs		Linear
Adobe	Mihrabs	Timber	Arches			Epigraphic
Timber	Cupolas and ceilings	Ceramic	Niches and screen walls			Vegetal and floral
Ceramic	Minarets	Plaster	Cupolas			Geometric
Capitals	Roofs and frames	Paint	Mihrabs			Architectural
Tiles			Corbels and muqarnas			

Apart from the examination carried out on the two case studies, The framework is transferred into the Faceted Taxonomy in order to produce "systematics" that are helpful in determining the structural invariants of the design idea's conception stage. Five conceptual macro-categories pertaining to the constructive, technological, functional, expressive, and meaningful aspects are included in the taxonomy (Condotta, 2019), as shown in Figure 7 below.

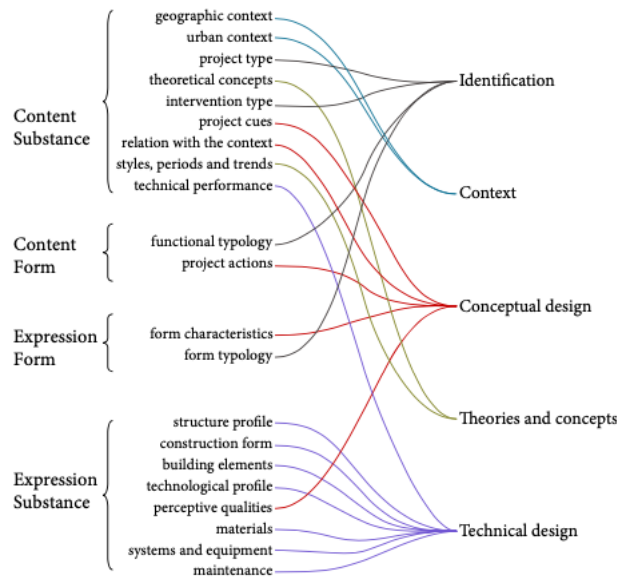


Figure 7Connections between the semiotic framework and the conceptual categories of the Faceted Taxonomy (Source: Condotta(2019))

The analysis of the main facades of Bouchama’s projects enabled us to identify some of the elements of the conceptual macro-categories:

- The project type (educational, administrative) has little incidence on the religious architectural vocabulary invariably employed in all his projects, but would dictate their functional typology.
- His reliance on geometry is visible in the overall aspect of the project, as well as in proportions. Symmetries are also strongly displayed in his projects, as well as monumentality.
- Ornament is a statement in all his projects, with their various forms and themes.
- Islamic architecture (regional and universal) is the source of inspiration for the architect, reflecting his extensive knowledge of history.

- Reinterpretation of historic and traditional forms using modern materials and techniques.

### Conclusion

In this article, we have examined Bouchama's architecture, during the post-independence era, which provided the historical background of his production through ideological and cultural contents. Two of the architect's most well-known projects were analyzed to corroborate the broad orientations that were revealed by his literary and architectural work.

Through the utilization of the theoretical semiotic model on our two case studies, we were able to ascertain the manner in which Bouchama's projects integrated Islamic architecture. In addition to the abstract decorations, geometry was essential to the façades' integrity and contributed to their overall harmony. Stability offered by symmetries and monumentality exhibited in main entrances were highlighted. Furthermore, the buildings' dynamic element is provided by the variation of skylines. However, in order to fully comprehend Bouchama's works and identify the references he employed in his architecture, a broader research corpus is necessary. At its core, Bouchama's architecture is "Algerian," despite its varied inspirations. It is a work of geometric and ornamental architecture that illustrates the architect's search for an Algerian identity. Even with a hint of nostalgia for bygone glories, his architecture remains a reflection of its era and the circumstances surrounding its creation.

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### Conflict of Interests

The Author(s) declare(s) that there is no conflict of interest.

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