

Morphological Aspect of the Residential Colonial Heritage in Batna, Algeria

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Abstract

In the wake of the reflections carried out by many researchers on the built frame produced during the colonial period, and in view of the situation of degradation and progressive loss recorded in the residential heritage of the colonial centre of Batna City, a subject of patrimonialization is still widely contested, of which this research comes to record an imprint. The objective of this research is centred on the identification of the typological elements of this original architecture, a methodology that will contribute to the constitution of a catalogue of architectural components of Banta's colonial heritage.

The In-situ observation and descriptive work, based mainly on the typo-morphological approach, are the means adopted for this research, which will allow us to know the foundations of the colonial residential building framework specifically, the individual housing of the colonial Batna nucleus, in order to establish the milestones of knowledge, and identify the forms of the islands, plots, and sizes adopted for the colonial Batna nucleus. Subsequently, the architectural styles will be referenced according to the ordering of architectural elements and ornamentation.

Keywords: Architectural aspect, Batna, seizures, islands, colonial residential heritage (individual housing), plots, architectural style.

INTRODUCTION

The socio-economic changes that the colonial nucleus of Batna has known are a natural and legitimate phenomenon, as is the case for all societies, which are confirmed in situ. This core is losing its houses one after the other, under the authorities look and the incapacity of specialists and associations who have constantly pleaded for the preservation of this heritage [1], considered as the gage for its sustainability.

Of undeniable richness and savoir-faire, its architecture marks the city center of Batna, which is the product of a voluntary and ex-nihilo action, created by the Military Engineers. They drew up an alignment and reserve plan, building at first the military camp and gradually the civilian quarters.

The origin of colonial architecture in Algeria goes back to a sensitive and painful period of Algerian history. However, the architectural styles of the projects carried out during the colonial period in Algeria belonged to those of the early modern period which manifested new forms of spatial planning. However, the contextual problems to be solved in this particular case of colonization forced the engineering officers to renounce some classical principles of city planning, while considering the social environment and security conditions[2](Malverti & Picard, 2017, p. 4).

This heritage was born in Algeria at the beginning of colonization. Between 1830 and 1840, the first attempts of colonization were limited to the large coastal cities: Algiers, Oran and Bône (Malverti, 1984, p. 230). While the colonizers passage to building the cities was legitimized by the takeover of a large part of the Algerian territory[3] (Malverti&Picard. 1994. 230), affecting the landscape and traditional towns with significant alterations.

After the implementation of a colonization policy in Algeria, the first measure of the colonial administration, established by Bugueud in 1947, was to structure the territory of Algeria with an urban framework consisting of strategic points, forming a network of cities, villages and colonization centers, from the coastal fringe to the desert gates fig.1,(Malverti, 1994, P. 230).

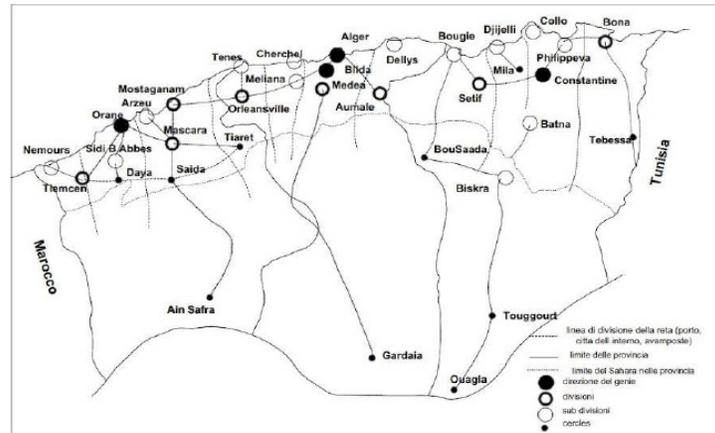


Figure 1. Redo of the general Reconstruction according to «La carte générale de l'Algérie» de LIEUSSOU, in «Les ports de l'Algérie», 1850. (BN/Cartes et plans), (dessin X. Malverti), redone by the author for reasons of legibility.

This networking constitutes, first of all, a response to the strategic requirements useful for military interventions and concerns the centers of Aumale, Setif, Batna and Guelma, which forms a continuous line of centers located at the gates of the desert. (Malverti, 1994, p. 230). Then, 42 colonization centers were created on Algerian territory between 1830 and 1860, on state owned lands, so that the city had to achieve strategic objectives: the general structure that the colonial city will obaidare the boundaries, the gates, the central square and the network of streets. (Malverti, 1994, p., 232).

Consequently, the elements within the city limits are then measured by considering inhabitants and the size of the garrison number, the area of the city is thus determined. Each alignment plan presents streets, which vary in size according to their importance, a set of lots for residential buildings and facilities, the central square, garden and agricultural lots (Malverti, 1994, p., 234).

Thus an “alignment and reserve plan” was established around 1844 to create the colonial nucleus of Batna, the case study dealt with in this research, whose architectural and morphological characteristics are developed below.

METHODOLOGY AND MATERIAL

Using a documentary background, notably the official colonial documents, the present research is developed by adopting three approaches. Firstly, to develop the analytical aspect, opting for a historical approach, supported in the second time, by a typological approach, the means to identify the types and their combinatories. Finally, to analyze the architectural aspect and to clarify the conceptual specificities of the facades of colonial habitat, resorting to the photographs taken, to finally make a classification of the architectural elements.

CASE STUDY

The valley hosting Batna’s colonial center is part of the Aurès, inhabited by the Chaouis Berbers who owned lands and zaouias: the Fezzan tribe, which will be concentrated in the Zaouia “village of Zmella”, baptised “Village Nègre” by the French on their arrival, the Ayth Adi tribe, the Ayth Sidi Yahia tribe, the AythChlih tribe and the Hraktas tribe.

Geographically, Batna is located in the North-East of Algeria fig2, between 4° and 7° East longitude and 35° and 36° North latitude, in the physical environment constituted by the junction of the Tellian Atlas in the North and the Saharan Atlas in the South, whose altitude varies between 1030 m and 1050 m.

In 1840, the location of the colonial center of Batna was only a fertile valley, where there were only a few mechtas and swampy lands in the south., Gsell mentions the existence of a few scattered Roman remains (Gsell, 1911). This site was part of the city of Lambèse, which was created by the decree of 12 September 1848 as a new city, giving it the name “Nouvelle-Lambèse”, but the decree of June 1849 gave it back the name of Batna (Piesse, 1862, p., 419).

Situated between the rugged reliefs of Belezma forests (Cote, 1991), at the intersection that Rome once valued [4], the French colonizers subsequently occupied this same intersection. This strategic place, where the line of contact between the huge Aurès massif and its northern piedmont, aligned from west to east, intersects the principal axis of meridian passage and links the coast to the Sahara fig. 2, is also the strategic place for controlling and commanding the Aurès region, impeded only to the west by the Belezma barrier (Cote, 1991).

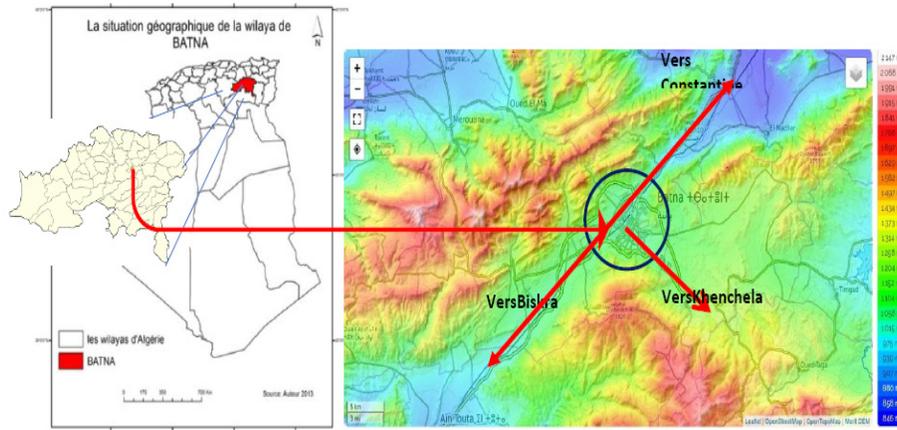


Figure 2. settlement location Choice for Batna's colonial nucleus in a low slope area. <https://fr-fr.topographic-map.com/maps/el9w/Batna/>, With author's intervention

The colonial center was built in several phases: first, the fortified military camp was built under the command of colonel Buttafoco in 1844 (Gsell, 1911), (Cote, 1991), (Malverti& Picard, 1988), it groups the military buildings structured in a grid pattern, composed of large barracks, hospital, shops, canteen, workshops, etc. Later, the enclosure is extended towards the north-west direction. Inside, the civil quarter was formed onwards from 1850, fig. 3, on an area of 12 hectares. This civil quarter reflects European architecture, consisting of individual and semi-collective housing and facilities, built piecemeal according to the needs of the colonial population at the time.

The enclosure is preceded by a moat [5]. Apart from its defensive role, it will make it possible to homogenize the structure of the city, to give more regularity to its islands, to the layout of the streets and squares (Picard, 1989, p.218). It is flanked by bastions and marked by four gates, which lead to four directions along the two main perpendicular roads, one oriented South-East, leading to Constantine and Biskra cities, and the other one oriented North-West leading to Lambèse and Sétif (Piesse, 1862, p.420).

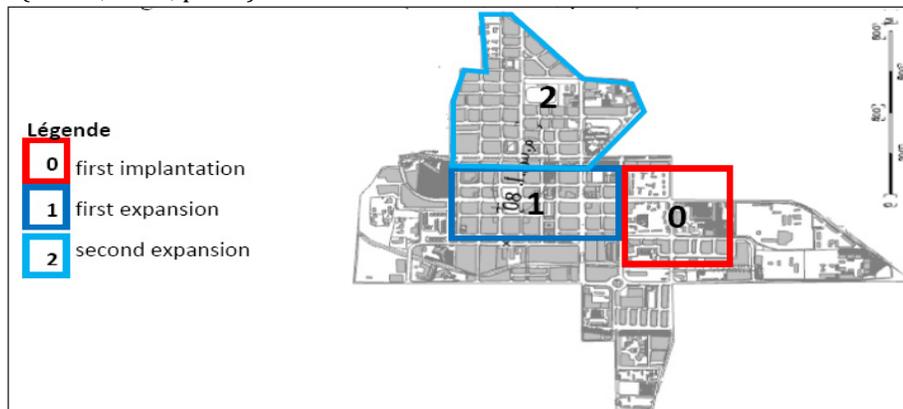


Figure 3. Formation process of Batna's colonial center.

Like other Algerian cities, the colonial center of Batna experienced a building frenzy following the influx of migrants of various nationalities who made up the population of the citadel, fig. 4, among whom were mainly French, Spanish, Portuguese and Italian workers, favoring the European-style construction of houses.

Further on, the native quarters were built [6], as Malverti states that the colonial centers are a military city, organized by the military engineering service on two quarters, the military camp is established first and then the civilian quarter [7], the colonists then isolated themselves behind the enclosure. Nowadays, this colonial center is the heart of Batna city.

The second extension is developed in the suburbs outside the city walls, following the saturation of the citadel nucleus. Several residential quarters appeared, the most important ones are:

- the "Stand" in the northern part of the city fig. 3, whose residences are in two forms: individual villas and semi-collective buildings, more modest in architecture than the facilities;

- the “Cité rurale” in the north-east;
- and the quarter of the “Verdure” in the south.

The “Stand” and the “Cité rurale” are both individual residential quarters. In addition to their residential vocation, the architecture and urban organization of this colonial nucleus are the product of an evolutionary process, whose characteristics refer to the imported European model.

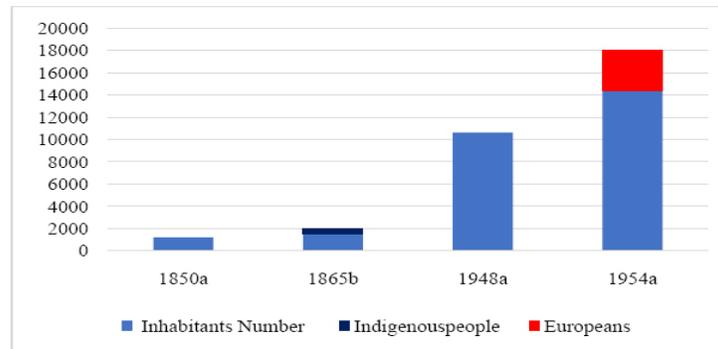


Figure 4. Population’s evolution of the city of Batna between (19th and 20th). Author’s tabulation, according to the references cited below. a . Cote, M., (1991). b . Anonymous document, de S. M. Napoléon III en Algérie, Algérie, Bastide, Libraire-éditeur. Constantine, Paris, 1865. P.314.

RESULTS AND DISCUSSION

ABOUT OF THE URBAN ISLAND

When the colonial army was installed there, the old agricultural plot was replaced by a new one. Since then, the Military Engineers of the African Army have maintained the right to oversee urban planning and extension of towns, for which they draw up the «alignment and reserve plan» or the «overall plan» of each city, village and colonial center.

The first alignment plan of Batna’s colonial center was then presented [8], where an orthogonal geometrical grid was prefigured, breaking with the traditional space (Cote, 1993, p.106), a support of wide openings, leaving on either side the pedestrian spaces used as terraces for cafés and bistros, and on which platanus trees have been planted. Beyond, small islands emerge, designed according to the size of the created center, with a regular shape close to the square and divided into plots. The islands drawn announce an urban composition for public use, grouping islands intended for civil facilities and islands conceded to private constructions and rarely those which combine the two functions. However, for more convenience, the military engineering service foresees rows and groupings facility islands, for hygienic functioning, operational or land cost reasons.

TYOLOGY OF ISLANDS

The configuration of the islands in the first plane established by the Military Engineers, with regular shapes and similar dimensions but limited in relation to those of the colonial nuclei of the cities. The islands have three forms according to the use, as shown in the following:

Isolated or Grouped Facility Islands

Rectangular in shape, placed in the center of the colonial nucleus, the isolated facility islands are grouped in alignment and placed perpendicular to the main street of the “Republic Avenue» fig. 5, the most important road. These are the following facility islands: The Church, the Police Station, the Municipality and the vegetable market, having respectively the following dimensions: 49m*69m, 49m*22m, 49m*30m, 49m*37m. for the grouped facilities islands, they are rejected in less central locations fig. 5A.

The Hospital Island is different because of its position and size, being on the edge of the civilian city, it faces the military camp on one side, on the other one it faces the enclosure toward the northeast direction, which explains the need for a direct relation with the military camp. Its size 59m*69m, provides information on the number of people and its indispensability in such wartime conditions. The aspect of its island is loose, this form comes from one or both aspects of its composition (Merlin&Choay, 2010, p.405):

- The built components show discontinuities, in the case of the Civil Hospital island is marked by green spaces and rest areas for the patients, a fountain and external circulation spaces [9];
- The built components have different orientations.

While the church is highlighted in its location, surrounded by an esplanade. It is located in an elongated square, crossed in the middle by the main avenue of the «Republic Avenue», the place is divided into two parts, one of which contains the church in the middle to mark its strength and its political independence, the other is occupied by a square with a fountain. This form of civil square is the ideal form of the squares planned as presumed (Picard, p.220).

For the island of clustered facilities, two of them are shaped as mentioned below:

- the first one gathers the Gendarmerie and the Civil Prison, rectangular in shape and 59m*69m sizes, placed on “Constantine Street”, important road, perpendicular to the Republic Avenue, and loose fabric aspect.
- The second island includes the school and a facility (not identified on the map), of rectangular shape of 49m*69m sizes. It is placed opposite the enclosure on the northeast side, whose fabric is loose. These last two islands show discontinuities, in the interior courtyards form, and the buildings are oriented differently. The grouped facilities are located far from the center’s traffic, to different degrees following a functional and relational logic between the military and civilian space, however their size is considerable.

Mixed Islands

The mixed island fig. 5B, groups together two functions, facility(ies) and residential plots «for private use» fig. 7. 59m*69m in size and rectangular in shape. Four islands have this form of grouping: the grouping of Sub-Prefecture and the residential plots, and the grouping of Civil Court and residential plots. In this case, the facilities face each other and run along the «Constantine Street”, the second most important road perpendicular to the “Republic Avenue”.

However, in the mixed island which includes the Treasury and the Post Office plus plots for private use, the facilities are located in opposition to the military camp in the “Republic Avenue” extension. In this case, a single building forms the facility, which leads us to say that this part of the island is rather loose, considering the construction tendencies of the residential part which is very loose. The configuration of the mixed island shows two aspects of its components: they vary in size and are not homogeneous.

Private Use Island

Also known as the «residence island» [10]fig. 5C, mostly rectangular and extended, the square shape is rare, of which the following dimensions are an illustration:

six islands of 69m*59m; four islands of 69m*69m; four islands of 69m*92m; two islands of 79m*59m; one island of 79m*65m; one island of 79m*69m; one island of 79m*20m; two islands of 65m*57m; four islands of 59m*57m; two islands of 57m*20m.

This set of residential islands is structured by roads, of which the two major ones lead to various directions The Republic Avenue and Constantine street, others are secondary and less important in terms of function and size.

Few buildings for private use were built up to 1850, the year in which the support map of this study was drawn up, which shows very loose fabrics and islands of larger size than those of the facilities.

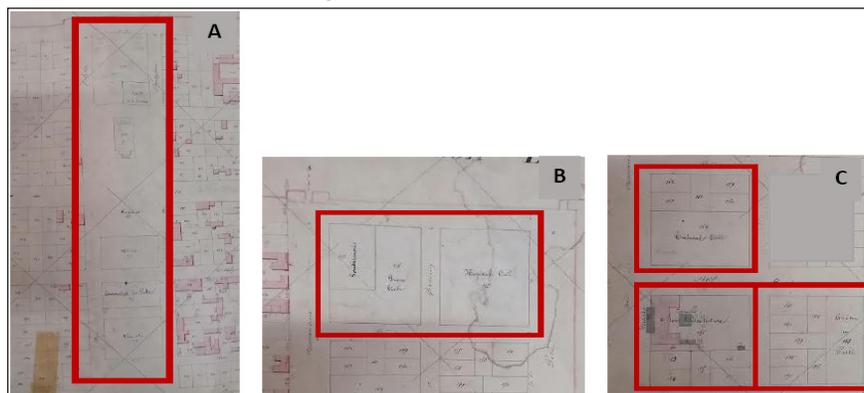


Figure 5. A. Isolated facility islands, B. Grouped facility islands, C. Mixed facility islands. Author’s photos taken from the cartographic Map.

ABOUT OF THE HOUSES PLOT

The plot is the geometric support assembled according to a logic, which becomes an element of the urban system once loaded with buildings to form the urban figures (Claire & Michel Duplay, 1982 p.302). The plot system presents the divisions of the soil island into plots and its cartographic representation. The shape of the plot varies from rural to urban, it can be square or narrow and elongated rectangle, other shapes are possible, it depends on the forms of subdivision. The orientation of the plots is then determined in relation to the access road.

Our case study presents regular islands and the plots resulting from the island’s division are also regular and formally homogeneous, they are intended to support an individual housing.

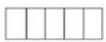
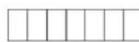
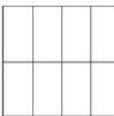
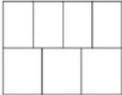
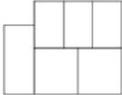
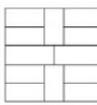
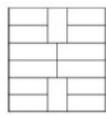
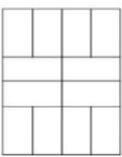
As soon as the overall plan was drawn up and the plot of land was laid out, the lots were made available to the migrants, allowing them access to individual properties. The most fortunate among them invested in the land by acquiring several lots to build either houses for collective use, or rental houses accommodating several modest migrants, the FRECON building [11] being an example of this. However, co-ownership is a form that emerged as a result of the scarcity of land, due to the rapid growth of European migrants in the citadel, and several buildings in the colonial nucleus also demonstrates this state.

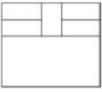
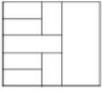
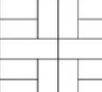
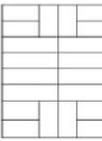
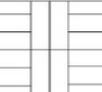
TYOLOGY OF PLOTS AND ASSOCIATION MODE

The number of plots resulting from the division of an island depends on the size of the island-residence. This division is governed by precise boundary rules and their concretization in topographic lines, visible on the ground and common with the neighboring plots.

However, the dimensions of the plots in the colonial nucleus are determined by their purpose: housing, facilities, garden or square. The plots are always perpendicular to the street, of varied dimensions and regular geometry (rectangular). Plot sizes and street widths are all controlled by rules of proportion and symmetry, as confirmed by Xavier Malverti (p. 232). And to know the nature of the plots and the modes of association, a typological analysis is necessary (Panerai, 1982, p. 414), as confirmed by André Chastel and subsequently by Philippe Panerai. In this research, the modes of association of the plots constituting the islands present the combinatorial patterns mentioned in Table 1:

Table 1. Plot typologies and association modes. Author’s analyse.

	ASSOCIATION MODE OF PLOTS AND IDENTIFICATION OF TYPES			
	TYPE	SUB-TYPE 1	SUB-TYPE 2	INTERPRETATION
TYPE A	 *2	 *2		- Association mode by juxtaposition of plot units.
TYPE B	 *3; *2	 *2	 *2	- Geometric division of the island; - Association mode by juxtaposition and leaning of plot units; - Variation in the shape and size of plots and islands. - Change in the parceling of the second sub-type imposed by the clearing of space created in front of Sétif Gate.
TYPE C	 *1	 *2	 *3	- Association mode by juxtaposition of plot units and leaning, with an increase in leaning units and a change in orientation of the juxtaposed elements.

<p>TYPE D</p>	 <p>*1; *1</p>	 <p>*1</p>	<ul style="list-style-type: none"> - Non-homogeneous plot sizes; - Association mode of by juxtaposition of units and by leaning against each other with a change of orientation; - the second variant presents continuities of the juxtaposed units.
<p>TYPE E</p>	 <p>*1; *2; *2</p>	 <p>*1</p>	<ul style="list-style-type: none"> - Repetitive association form with dimensional variations of the first variant: One island=69*69, two islands=69*59, two islands: 79*59; - Association mode of plot units: *Two leaning elements 1*1 which form the base of the composition, they receive, on both sides, at their central junction limits four elements 2*2. Eight elements are juxtaposed to the 1*1 plot, backing up the 2*2 plots. The last sub-type has a larger leaning base, consisting of 4*4 elements.
<p>TYPE F</p>	 <p>*1</p>		<ul style="list-style-type: none"> - Association mode by continuous juxtaposition of units and by leaning with a change of orientation.

Typology of the Individual Colonial Housing

Up to now, the colonial residential building of Batnacity has been subject to dismemberment and major transformations, which hinders our approach to classify the colonial housing building and measure its footprint. This is why we opted for a morphological reading façade elements.

This section is therefore devoted to the types of housing produced by the colonists, designed to match their lifestyle, which were adapted to the semi-arid Mediterranean climate, adopting certain constructional measures such as the use of shutters, which are a French invention for ventilation reasons, which became a priority in this context (Charlery, 2004). In addition to their insulating qualities due to their great thickness, the walls of all types of colonial dwellings are bearing the usual construction techniques limit the width of the openings, which are rarely more than one meter wide, and are therefore larger than wider, which means that the full dominates the empty space and the façades become heavy.

In order to understand the housing typologies, we used different materials, Published documents on the history of colonial architecture in the world and in Algeria on the web,

in-situ visits and photos taken by researcher. In this perspective, the typologies of the habitat are presented in two forms in the colonial core, which appeared progressively with the evolution of the urban fabric, detailed below as follows:

The individual housing is quite particular since it differs from the indigenous housing as well as of the metropolitan housing and that of the ancient French territories, including the tropical America (Charlery, 2004). However, the individual housing of the colonial center of Batna is presented in two variants: houses in line and houses set back.

Aligned Houses

The first extension of the colonial nucleus fig. 3 .is the first civil district in the image of small European cities. Its morphology and urban characteristics are typically based on an aligned plan and a layout founded on mechanical accessibility with the introduction of the concept of urban facade and new housing typologies. The houses with alignments are composed of ground and first floors, sometimes with an integrated business, it has two compartments, the first one is built including the living spaces, the second one is unbuilt as a courtyard in a rear position, where the sanitary block is usually associated.

The morphological segment is limited to parallelepipedic volumes with sloping roofs. The openings are vertically oriented, see photo 1. They consist of two types, one perfectly symmetrical in relation to an axis that coincides with the middle of the main entrance door, with windows on both sides louvered, representing a form of climatic adaptation, see photo 2. The second type is asymmetrical, see photo 3.



Photo 1. One-storey house on the street with a symmetrical facade and a gable roof. Author's photos



Photo 2. Single-storey house on the street, consisting of ground floor and upper floor. The facade is asymmetrical with a balcony and a three-sloped roof. Author's photos.



Photo 3. Single-storey house on the street, consisting of ground floor and upper floor. The facade is asymmetrical with the use of a semi-circular arch and the roof which has three slopes. Author's photos.

The decorative repertoire was limited to a few elements such as the cornice; supported by consoles overhung by a molding frieze, see photo 4 A, B. Sometimes, the arch overhangs the openings, see photo 4 B. They are also framed with bricks or cut stones as well as at the two limits of the facades, see photo 4 C. Earthenware, inspired by Moorish architecture, frames the windows, see photo 4 A. The houses are built in stone, brick and wood, the walls are rendered with adobe, underlined by a basement, see photo 4 D, all covered with a tiled roof, whose typologies vary between double slopes, three slopes and four slopes.

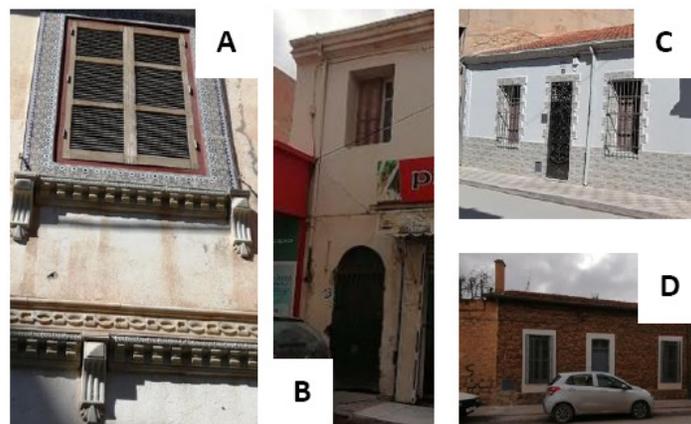


Photo 4. examples of single-story houses on the street, and architectural treatment. Author's photos

Houses with Verandas

Intended for Europeans [12], the villas were generally grouped together, built in the “Stand” quarter, this housing model is almost non-existent in the indigenous vernacular repertoire, introduced to Batna city, as a new model which symbolizes by excellence the colonial bourgeois architecture, made up of ground floor and first floors, and the house set back from the street.

Locally designated as ‘villas or veranda houses’. According to the terminology of the colonial houses, the veranda of the colonial house refers to the uncovered outdoor living space (Boutabba H. & all, 2014), it runs along the main facade of the dwelling, opening on the street, and sometimes in continuity with the garden surrounding the house see photo 5. The latter can be in an adjoining position or in a corner position, in which case the side façade faces the street see photo 6.

The veranda is a semi-private space that allows for a spatial hierarchy, from the public space (the street) to the private space (the house). The low height of its fence, which doesn’t exceed 1.20m including wrought iron, symbolized the extraversion of the house, reflecting the lifestyle of the colonizers.

Frequently, the facades are ordered and vertically oriented. the position of the entrance doors, of the main building and of the enclosure, are dependent on each other, i.e. the position of the entrance door on the enclosure wall, whether it is lateral or central, automatically follows its position in the main building, see photos, 6, 7, 8, 9.



Photo 5. Corner house with veranda in continuity with the garden. It consists of ground floor + upper floor with a balcony and a three-slope roof. Wrought iron is integrated into the wall of the fence and is almost 1.20m high. Author’s photos.



Photo 6. Corner house with veranda in continuity with the garden. Consists of ground floor and first floor. The roof is double sloped. The entablature balconies are decorated at the top with floral the entrance bay is on the side. The fence with integrated wrought iron is 1.20m high. Author’s photos.



Photo 7. House with a corner veranda. Consisting of ground floor plus first floor, a hipped roof and a terrace overlooking the veranda. The fence is almost 1.20m high, with wrought iron. Author’s photos.



Photo 8. House with a corner veranda. Consisting of ground floor plus first floor and a terrace, overlooking the veranda, which has a wrought iron railing. The roof is hipped, however the fence with the integrated wrought iron is almost 1.20m high. Author's photos.



Photo 9. House with veranda and common walls. Consisting of Ground floor and the first one. Terrace with wrought iron railings, overlooking the veranda. Laying of the faience frieze on the facade decorating its top. Author's photos.

THE ADVENT OF A NEW ARCHITECTURAL ORDER IN THE AURES, ALGERIA

Far from being a landscape project, the structure of the colonial nucleus of Batna city responds to criteria of rationality, efficiency and performance. However, the core facilities were built gradually as the colonial population needed them. [13].

In terms of urban planning, the colonial nucleus of Batna city was designed according to a grid pattern following the 16th century Spanish model of the new cities of Central and South America, which was taken up by the French and the English in the 17th and 18th centuries. The geometric layout originates from Greco-Roman antiquity, organized along two axes *dacumanus*/maximum, commonly used for the organization of occupied territories (Malverti, 1997).

In terms of architecture, the colonizers first relied on the neo-Moorish style in order to tame the colonized indigenous population. This style, known as the «Jonnart style» and «neo-regionalism», is an imitation of Arab-Muslim architecture under the aegis of Charles Célestin Jonnart [14], and symbolizes the protection of the natives, which goes with the intention to demonstrate sociability in colonial cities.

Charles Célestin Jonnart showed a particular interest in the Moorish style and subsequently made it official in 1905. It was for economic, political and cultural purposes that the governor instructed architects to honor the Moorish aesthetic, advancing a new neo-Moorish cultural and architectural Algeria identity. BACHA claims that the tendency to produce this style is relatively limited in the superposition of typologies, hence the appearance of decorative elements of Moorish reference on the building facades of the colonial nucleus.

This style emphasizes some architectural criteria to honor the facilities architecture namely, the rhythm and harmony of proportions; the use of basements and mosaic tiles with a wide variety of floral and arabesque motifs and the framing of openings in brick or stone or even in patterned ceramic tiles, the use of eaves, monumental doors, domes and horseshoe arches; capitals with simple corbels and columns with cylindrical or fluted shafts in twists. Whereas the architecture of the colonial housing in Batna, regardless of the types, presents a timid and more simplistic formula of this style, see photos 4, 6, 9.

The second style adopted to constitute the landscape of the colonial nucleus of Batnacity is the neo-classical style 'victorious style' (Picard, 1994, P. 124). Through the use of this style, the administration sought to display figures of bourgeois civility, impress the natives, establish order and moreover, the colonizers appreciated the monumental aspect attributed to the public buildings, which contributed to a development of urban comfort based, essentially, on aesthetics, hygiene, and pleasure.

This style was introduced in 1863 with the construction of a church in the center, then other constructions are built, whose main morphological characteristics are: The simplicity of volumes (parallelepipeds), proportionally harmonized; the use of sculpted ornaments inspired from antique architecture: triangular or segmental pediment, pilaster, sculpture, balustrades, pilasters, cornices, floral bas-reliefs, exterior portico (entrance), cartouche, etc.

The enhancement of the mineral surface of the building using bare or embossed walls, symmetry, the rhythmicity of the openings vertically and horizontally, the large windows of times with balconies that run along the facades, see photos 10A, B, C,. The decorative motifs are varied and contributed to the animation of the façade, see photos 10D, F . The balconies are generally overloaded with decorations with beautiful ironwork and corbels that fulfill both a functional and aesthetic role, see photos 10A, C, E, F. The ground floors in the colonial center are reserved for shops. The building materials vary from cut stone, brick, wood and concrete with decorations in wrought iron, plaster, marble and stucco, see photos 10B. The roofs are tiled and there are few accessible terraces.



Photos 10. examples of colonial architecture houses showing architectural treatments, Author's photos.

While the architecture of the residential colonial buildings in Batna, all styles considered presents a timid and more simplistic formula of neo-Moorish and neo-classical styles. See photos in the habitat typology section [15].

CONCLUSION

The morphological reading based on the classification of architectural typologies is an ideal tool to analyze the built heritage and to archive these architectural characteristics, for eventual interventions that would contribute to its valorization and allow a functional and aesthetic development to the colonial cities [16].

The present researches show the ability of military engineers to plan cities, they are applied to carry out such operations on a large scale, they have knowledge of the practice and are conscious of the specificities of the place, and they strive to apply a specific model that tends towards the ideal. It resorted to the classical repertoire of architectural treatises and spatial design, using population and object counts to plan the colonial center, adopting simple and rational geometries in recognition of the colonial's lifestyle, economic conditions, social classes and the hierarchy to be respected regarding the public space use.

From this research, we retain some typical aspects of the architecture of the colonial nucleus of Batna. Actually, this core is the heart of the city and its architecture has been an integral part of its urban landscape since its creation. It is the site of various activities: trade, housing, services, meeting places and various socio-professional activities.

Despite the poor quality of the land as a major difficulty, this did not hinder the installation at this location, given its strategic importance; instead the Military Engineers opted for appropriate buildings seizes (ground floor plus one). The overall plan is conditioned by the rampart's layout, from the outset, two districts are developed within it, one is military and another is civil.

The regular shape of the islands and plots depends on the basic grid shape. This regular form is adopted for functional, hygienic, economic and rational reasons. All the urban islands within the city limits, intended for buildings or squares are structured in a grid pattern which varies in function, and take three forms:

- Isolated or grouped facilities islands;
- Mixed island: they include residential plots and facilities plots;
- Residential island: intended for housing, generally installed far from the military camp;

Their location depends on their importance and obeys to military and social logics of a functional, rational, useful and aesthetic nature. However, the agricultural and industrial islands are placed outside the enclosure: the hospital is close to the military camp, all the grouped islands facilities and isolated islands which include the square, the church, the town hall and the market are aligned and placed in the center of the colonial nucleus, cutting the Republic Avenue at right angles. Other facilities are placed far from the center, in alignment with the Constantine Street. However, schools are grouped with facilities or integrated into the residential islands.

The architectural styles adopted are the Neo-Moorish and the Neo-Classical style: the first symbolizes protection and encourages the natives to integrate by showing a willingness of sociability in the urban area. The second displays an image of bourgeois civility to fascinate the natives and to establish order, without upsetting the European population, which is accustomed to monumental figures, aesthetics, hygiene and urban pleasure.

Other important themes to explore are the interior design of the colonial houses and the transformations they carried out, the reasons for this and how to solve the problem of the city development without constraining the colonial fabric, resorting to the protection of this capital. These are important issues to be tackled in order to enhance this colonial heritage.

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NOTES

[1] Revue Batna info, January, 2013. Some failed attempts by architects to save the colonial buildings, such as the demolished foreigners' hotel.

[2]« *Il s'agit de juxtaposer un espace militaire nécessaire au casernement et un espace civil pour accueillir les colons, de composer un paysage français sur une terre africaine pour «civiliser» l'Indigène et satisfaire l'Européen, et de réaliser un espace d'échange moderne pour distribuer et dénombrer les hommes et les richesses.* »

[3]The action is concretized after the pacification of the Algerian territory and the resistance of Emir Abd El Kader was eradicated, followed by the establishment of a colonizing population.

[4] This task was assigned to the military urban engineering engineers attached to the technical service of the army (Picard & Malverti, 1989, p. 215), who were named as the project manager of all the necessary military colonization works and mixed territories (Malverti, & Picard, 2018).

[5]Arriving at this region and recognizing its great worth, a little far away, the Romans created several settlements: Timgad and Lambèse in the east, Zana in the north and Lamasba in the west.

[6]Referring to the document on the city of Sidi Bel Abbès, the ditch is 3 meters deep.

[7] MalvertiXavier and Aleth Picard describing the city of Sidi Bel Abbes which is a colonial creation, in *Les villes coloniales fondées entre 1830 et 1880 en Algérie*. [Research Report] 489/88, 1988. hal-01902566.

[8]We should note at the outset the contribution of the «alignment and reserve plan» as a reference document in cardboard format, still preserved but in bad condition. This document presents the first plan of the citadel, which has been replaced by another and executed. It provides information on the large openings, the islands, the plots and the built-up area up to the year 1856.

[9] The analysis is carried out on the location of the hospital based on the first alignment plan while considering the design of the typical hospital plan at its new location.

[10] According to Picard (1986) the overall plans elaborated by the Military Engineering, the residential islands are colored pink, as is the case for the part of the building mentioned on the map drawn up for the colonial Batna's center.

[11] FRECON building, built in 1934, still existing, located at the corner, bordering the Republic Avenue and the Fidayines Street, ex-Gambetta Street. The building consists of three floors with an accessible terrace, each floor containing several apartments. Get account in situ.

[12] As Jaques Silillou presumes, the houses with veranda were built mainly in the neighbourhoods where the Europeans lived.

[13] Malverti and Aleth, p. 27. Describing the new city of Sidi Bel Abbès: « *Les équipements se répartissent dans la ville selon des règles. Ainsi le nombre des équipements dans un établissement détermine son importance dans le réseau de ville. Le village comporte les cinq édifices de base : l'église, la mairie, l'école, la justice de paix et le presbytère. Peuvent s'ajouter selon la grandeur de l'établissement : le théâtre, l'hôpital, le marché, la gendarmerie, la préfecture, voir quelque fois des équipements pour les Indigènes. Il est important de signaler l'ordre dans lequel les Ingénieurs du génie de chaque place classe l'importance de ces édifices : l'église, l'hôpital, le marché, l'hôtel de ville, la prison, le tribunal, la gendarmerie, le théâtre, et les logements pour les services civils.* »

[14] See the photos in typology of housing section

[15] The main document consulted to prepare this research is the first "alignment and reserve plan" proposed. This research was carried out under complicated sanitary conditions worldwide and the restrictions on travel, did not allow us to go deeper on the subject of individual colonial housing and explore the second "alignment and reserve plan" proposed and realized in the field.

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