

A Glimpse into the History of Architecture in the Algerian Sahara from the Neolithic Era to the Emergence of Saharian Ksours

لمحة عن تاريخ العمارة في الصحراء الجزائرية من العصر الحجري الحديث إلى ظهور القصور الصحراوية

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• Abstract:

The civilizational succession in the Algerian sahara has recorded details of the first beginnings of the dwelling in rock art paintings, and continued to be mentioned until the Middle Ages through material remnants, some of which are still standing today, and since the desert, despite its climatic imbalances that made it after the "savannah" areas, made it arid deserts that affected the building pattern and led to the development of an appropriate architecture known as desert architecture, this architecture responded to certain conditions to ensure human survival. In this brief research, we tried to highlight the most important civilizational milestones in the development of housing in the Algerian desert, from the first brick laid by the man of that period to the emergence of desert palaces, which express another challenge to a different environment that is still today. The most important results we obtained after proceeding with this research are the existence of close links between the architectural features of the Neolithic architecture in the Algerian Sahara and the different types of desert palaces, as the same features persisted and defined the known desert palace patterns.

Keywords: Architecture - Algerian Sahara - Neolithic era - Saharian Ksours.

ملخص:

لقد سجل التعاقب الحضاري بالصحراء الجزائرية تفاصيل عن البدايات الأولى للمسكن في لوحات الفن الصخري، وتواصل ذكرها حتى العصر الوسيط عن طريق مخلفات مادية لازال بعضها قائما إلى اليوم، وبما أنّ الصحراء رغم اختلالات المناخ بها التي جعلت منها بعدما كانت مناطق "سافانا" جعلت منها صحاري قاحلة أثّرت في نمط البناء وأفضت إلى استحداث عمارة مناسبة لها عرفت بالعمارة الصحراوية، استجابت هذه العمارة لشروط معينة لتضمن بقاء الإنسان . في هذه العجالة البحثية حاولنا إبراز أهم المحطات الحضارية التي عرفها تطوّر المسكن بالصحراء الجزائرية من أول لبنة وضعها إنسان تلك الفترة إلى نشأة القصور الصحراوية التي تعبر عن تحدٍ آخر لبيئة مختلفة لازلت لليوم، أهم النتائج التي حصلنا عليها بعد المضي في هذا البحث هي وجود صلات وثيقة بين السمات المعمارية للعمارة في العصر النيوليتي بالصحراء الجزائرية وبين مختلف أنماط القصور الصحراوية بها، حيث استمرت نفس السمات وحددت أنماط القصور الصحراوية المعروفة.

الكلمات المفتاحية: العمارة ؛ الصحراء الجزائرية ؛ العصر النيوليتي ؛ القصور الصحراوية.

• Introduction

The Algerian sahara belongs to the Sahara, which is the greatest sahara in the world, as it is known for its vast area and the harshness of its nature, as it is the hottest and driest region, but this state of the Sahara in general and the Algerian sahara in particular has witnessed radical changes in its climate and natural and topographical characteristics due to its location in an area highly exposed to them due to its astronomical location, and no doubt that the presence of man in these areas was followed by vigorous attempts to adapt to all new conditions. If we say the dwelling, it represents a safe haven, which in turn developed in parallel with human intellectual development and the aforementioned changes. Researchers in archaeology and anthropology raise the question of which regions were the cradle of humanity and knew the first presence of humans through their material remnants, and research into these remnants may reveal some clues, support some theses and theories, and refute others.

The Algerian sahara has known many civilizational stations that have passed through the human being who inhabited it since ancient times, and these stations varied according to the historical periods to which they belong, and many researchers have classified the material remnants, especially those dating back to the prehistoric period, including paintings containing rock inscriptions, rock art paintings, and various stone industries that revealed to scientists many facts about the history of the sahara and its human geography through the ages, and revealed details in human life since ancient times and its war with constantly changing conditions to survive and continue this organism through generations.

There is no doubt that one of the most important human requirements is to have a shelter and a safe haven that protects him from the harsh climate and the threats of fierce beasts and the enemies of his fellow man, and the dwelling has achieved this goal, which researchers consider among the instincts carried by human beings, where the instinct of refuge is the most important, which, if achieved, allows man to set out and rebuild the land, and the passage of civilizations and their evidence is the best evidence.

This research aims to find links and evidence of the existence of architecture in the Algerian sahara that evolved and diversified its patterns according to the changes it underwent, with the shadow of these older architectural features persisting until the emergence of sahara palaces as a unique architectural style that meets the conditions required for its survival and permanence to serve human needs of shelter, security, and stability.

From the above, we can pose the following question: "The urbanization of the Algerian sahara continued from ancient times until the Middle Ages, which witnessed an architectural boom represented by the construction of what is known as the sahara palaces." Are the sahara palaces considering an extension of this urbanization or are they unique in their characteristics and styles?

In order to answer this question, we chose to use the following approaches: The historical approach to trace the historical periods of the emergence of this type of architecture, the

descriptive approach to describe some components of the dwelling through the ages from the Neolithic era to the emergence of sahara palaces, and the comparative analytical approach to identify the characteristics of architecture in these periods and explore their various interrelated features to reach links and connections between the various episodes of the development of architecture in the Algerian sahara through cultural stations and geographical spaces that we chose as examples between the two periods mentioned.

1. Idiomatic definition of architecture :

It is the "art of building" according to the definition of dictionaries, as it is considered a science and art, and integratively it is an art for which many engineering and technical sciences are utilized to implement it, and architecture is one of the most important means taken by man to express his hopes and aspirations for life on earth, shared with his fellow human beings. It is also known as a functional formation (Fonctional Composition), which performs human purposes and life requirements by spatial and material means, and is closely related to the life and time of society, and it is subject to civilizational, temporal, social and economic influences, as well as natural and climatic factors. Throughout the ages, architecture has been affected by multiple circumstances such as climate, the nature of the land, religions, society's customs and traditions, all these variables made human behavior towards architecture variable and effective, but reaching a high level of building and construction passed through the accumulation of human knowledge, which was called arts for utility, and Vitruvius explained in his book: The Ten Books of Architecture, the two most important qualities acquired by man in this way are "talent" and "science", as the innate talent was followed by a science that transformed all experiences and experiments since their inception into a self-contained science. Vitruvius gave architecture the most important definition that had the greatest impact on the Western world, as he believes that it is represented by three aspects **Firmits _ Utilitas _ Venustas**, which summarize the functional, structural, and aesthetic foundations of architecture.¹

1.1 The beginning of the Neolithic civilizational features of the colonization of the Algerian Sahara

Based on the study of archaeological and anthropological evidence, it has become certain that the temporal distribution of prehistoric times was not the same in the various geographical countries distributed on the continents of the ancient world, as the Mesopotamian region lived these periods to their end until the late fourth millennium BC, in North Africa it continued until the early first millennium BC, in northern Europe it continued until the first century BC, while in the New World it remained until the fifteenth century AD, and due to these imbalances in this distribution,

¹ Kababla Mubarak - The evolution of building materials and methods in Saharan architecture - Thesis for the degree of Master's degree - specialisation in Saharan archaeology - Faculty of Humanities and Social Sciences - Mohamed Khayder University Biskra - 2009/2010 - p. 11.

population movement fluctuated and various cultural manifestations were disturbed with it, especially the appearance and development of architecture, and accordingly.²

If we consider that the continued colonisation of an area is the result of the continued presence of a certain human race or race and the inheritance of this geographical space by subsequent generations, the region that extends in the middle of the geographical area called the ancient Maghreb, which continues across the Algerian Sahara, witnessed the emergence of pioneering civilisations in the deep stone ages that preceded the Neolithic Revolution, such as the emergence of a civilisation after a break of thousands of years, sometimes known as the Ibero-Moroccan or Wahrani civilisation and other times Ibero-Mauritian, due to its extension to the coast of Spain, from 13500 B.C. to 8000 B.C. From 13,500 B.C. to 8,000 B.C., various material evidence such as bone industries, quarries and manicured stone industries have been attributed to the name of the founder of this civilisation, homo Mashta al-Arabi, who paved the way for the continuation of human and civilisational reconstruction in the Neolithic period.³

Various evidence and studies indicate that the beginning of the Neolithic period in the world was in the northern Mesopotamian region, starting from 8000 BC to 4900 BC. During this period, a civilisational revolution was witnessed that led to the emergence of new lifestyles as a result of the availability of a suitable climate conducive to development, manifested in the emergence of agricultural villages for the first time in their primitive forms, coinciding and parallel to the emergence of permanent agricultural activities such as farming and domestication of animals.⁴

Some of the most important sites that date back to these villages are Jermua, Tel Hassouna, Zawi, Shidar Malafat, and others, which represent the presence of huts built with stone walls in which hand axes and lances were found.⁵

As for the North African region, especially the Sahara, especially the Algerian Sahara, this region has been the focus of prehistoric research activities, starting with the first serious study ever carried out by Reverend Richard in 1868⁶, followed by many specialised studies⁷, where these studies took into account many material evidence such as stone industries, pottery and some technologies in addition to various consumables that indicate the presence of a type of primitive and stable agriculture, and a new lifestyle, which turned out to be the result of human migrations that came to

² Mohammed Al-Ani - The Originality of the City as a Geographical and Planning Unit - An analytical study in the factors of emergence and characteristics of planning thought - Dar Aladdin for Publishing, Printing and Distribution - Damascus - Syria - 2010 - p. 17.

³ Francis Orr - Translated by : Sultan Muhaisen - Paleolithic Civilisations - Alpha B Press - Bibliotheca Alexandrina - Alexandria - Arab Republic of Egypt - 1995 - p. 147.

⁴ Khazal Al-Majidi - Prehistoric Religions and Beliefs - Volume 1 - Dar Al-Shorouk for Publishing and Distribution - Amman - Jordan - 1997 - p. 27.

⁵ Lakhdar Ben Bouzid - Ancient Neolithic Cultures in the Central Sahara - The Hebrew Journal for Historical and Archaeological Studies in North Africa - Maj: 05 - Issue: 01 - January 2022 - p. 131 - 132.

⁶ C. K. Zerbois - General History of Africa - Methodology and Prehistory in Africa - Volume 1 - UNESCO - John Publishing and Distribution - Paris, France - 1980 - p. 592.

⁷ See research : "L. Pallot, The Algerian Sahara Oceanographically (1955); Chauvillon, The Saoura Region (1964).

the region from the south⁸. These migrations were the beginning of a new era in the Algerian Sahara, where the Neolithic or, as the term for this human movement, "Neolithic with Saharan influence" was used to describe the beginnings of a new era in the Algerian Sahara, where the first beginnings of the Neolithic era took Saharian.⁹

These studies have shown that the emergence of primitive villages in North Africa and the Central Sahara predates agriculture and animal domestication, and that pottery and grinding stones appeared at many sites before them, confirming that things developed very differently in North Africa than they did in other regions of the Near East.¹⁰

There is no doubt that the Neolithic period in North Africa has unique characteristics from the rest of the world, as it is very young and continues even to the heart of the historical periods, as it did not know a transitional period after it to prepare for entering the historical period, and the evidence of this is that the civilisations established at the beginning of the latter were Neolithic-influenced. This is consistent with the remains found in the Segus area in the southeast of Constantine, which contained the remains of about 10,000 dwellings and shelters similar to the terraces that we find at the top of the cliffs, which testified to the beginning of architecture art.¹¹

Many names have emerged for the Neolithic era that prevailed in the Sahara and gradually covered vast areas, whose geographical field extended from the coasts of the Sahara in the south to the Auras region in the north, where the features of this era were distributed after studying many remains and extracting the various changes that occurred in industries, arts and lifestyles. The name "Neolithic with cage influence" emerged, due to the spread of the cage civilisation in the region beginning in the 7th millennium BC in the south and this extension progressed towards the north to reach the first millennium BC¹².

The Neolithic sahara was also known for its sahara influence, which had phases that were divided based on the study of the sites where it spread, such as the Haggar, which are two main phases:

The ancient phase, starting from the end of the seventh millennium BC (6100-6150 BC) until 4550 BC, and the modern phase, starting in the fourth millennium (3350 BC) until 3450 BC, the most important areas of which include the Abdel Azim site in the far southwest on the banks of the Saura Valley, the Tablabala site in its west, the Ramadia site in Reggan, and several sites in the Great Eastern Race¹³.

1.2 The emergence of populations throughout history:

⁸ While Vaufrey called this era the "Neolithic with a cage tradition" - Sée : R. Vaufrey. *Préhistoire de la'frique*. Paris 1966.p250_300 Camps called the Neolithic Atlaso-Saharan Neolithic : - G. Camps- *Les civilisations préhistoriques de la'frique du Nord et du Sahara* 280 - 283.

⁹ C. K. Zerbois, op. cit. p. 592.

¹⁰ Lakhdar Ben Bouzid - Ibid - p. 131.

¹¹ Charles André Julien - *History of North Africa from the beginning until the Islamic conquest of 647 AD* - Translated by: Mohamed Mzali - Al-Bashir Ben Salama, Tawalt Cultural Foundation - Tripoli - Libya - 2011 - p. 44 - 45.

¹² Saïd Chalalqa - "Civilisational manifestations in the Algerian desert from the Neolithic era" - *Journal of Historical Studies* - No. 16 - May 2015 - University of El Oued - p. 44.

¹³ Al-Saeed Chalalqa, op. Cit. p. 45.

When researching the origin of the city, there is an opinion that the caves in the mountains and plateaus that humans sheltered in the stone ages are the first seed of shelter and housing, and thus the first seed of the city¹⁴, but by the Neolithic period, several pivotal transformations appeared in human life that led to the transition from food gathering and hunting to the stage of raising livestock and agriculture and changed their entire lifestyle, and nomadic clans turned into stable local communities, replacing the scattered disjointed groups. In this sense researcher Gordon Child believes that Paleolithic hunters inhabited the same cave for many generations at times, because their attachment to it was very close, and this attachment continued until he succeeded in practising primitive agriculture for the first time, before he had new ideas of separation from it and attachment to the piece of land on which he practised this agriculture¹⁵.

This was the first step to independence from the cave and following another type of stability, which is the emergence of the beginnings of building, relying on the oldest social form of production, the "primitive commons"¹⁶, where the collective work based on it contributed to the development of their lives with the successive inventions that enabled the practice of simple economic activities, he knew how to make a sharpened axe, light a fire and build a dwelling, and the emergence of communities that share one interest: providing food by farming and fighting for hunting and protection.¹⁷

Despite the lack of many indicators related to the historical depth of prehistoric sahara architecture¹⁸, it is possible to look at some clues and clues that were the result of ongoing research that suggest that the earliest traces of dwelling in North Africa date back to the Lower Paleolithic period. In this layer in the Ain El Hanash and Naqous regions of Patna, the remains of stones were found that suggest a process of ground preparation, and caves were found that were occupied by humans in the coastal areas. In the Algerian sahara, especially in the Tassili Azjar region, the remains of hearths, ashes, bone fragments and pottery were found inside rock shelters equipped with an outer wall paved with stones, while in the Ahgar region, humans in the period between the seventh and third millennium BC exploited "granite" hollows. In the Ahghar region, humans

¹⁴ Halim Hussein Arif — Hassan Bayad - Planning and Organisation of Cities between Theory and Practice - Volume 1 - Dar Jahan for Publishing and Distribution - Alexandria - Arab Republic of Egypt - DS - p. 14 - 15.

¹⁵ Arnold Hauser - tr : Fouad Zakaria - Art and Society Throughout History - Part 1 - Volume 1 - Dar Al-Wafaa for Printing and Publishing - Alexandria - Arab Republic of Egypt - 2005 - pp. 24-25.

¹⁶ The primitive commons: The first social economic system in history, where the means of production used by man were simple and primitive, based on very few labour skills and experience. These factors and conditions forced individuals to pool their efforts and forces to face nature in each tribal "commons" group united on the basis of blood kinship, and because the production of these groups was small, it was divided equally among its members, making it free of any form of class or distinctions. (See :) Munther Muhammad Radi - Economic Systems in the Twentieth Century - 1st Edition - Dar Al-Janadaria for Publishing and Distribution - Amman - Jordan - 2015 - p. 24.

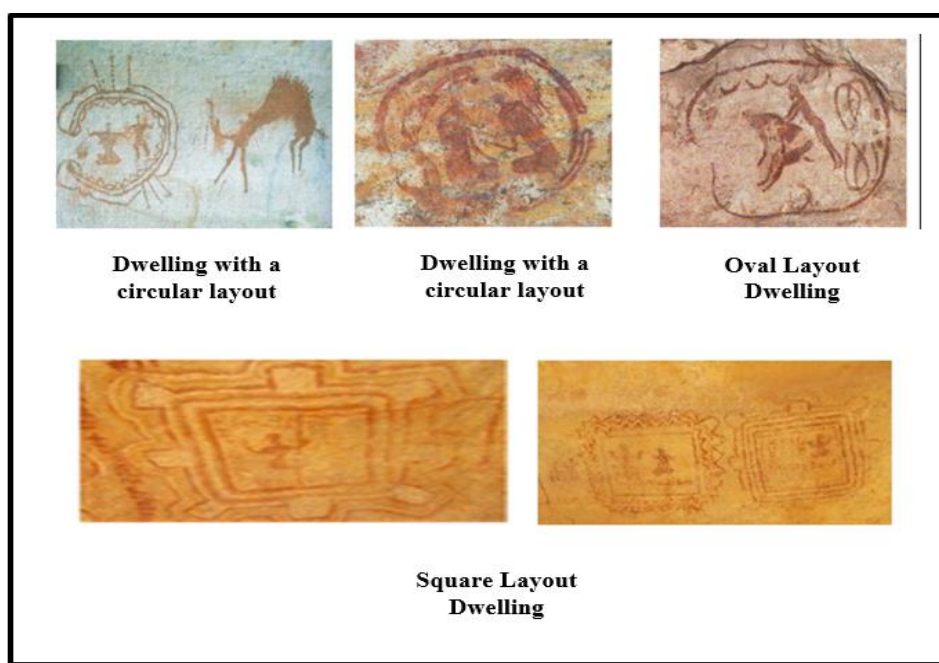
¹⁷ Segal - A glimpse of the development of society since the beginning of history - 6th edition - Damascus - Syria - 1978 - p. 6 - 8.

¹⁸ Ibrahim Ahmed Mahajneh et al - The Arab City - Challenges of Urbanisation in Transforming Societies - 1st Edition, Arab Center for Research and Policy Studies - Doha, Qatar - 2020 - p. 425.

exploited granite hollows and equipped them with curtains and walls made of plant fibres and leather¹⁹.

If we trace the spread of the Neolithic agricultural economy in the world, and through it the spread of primitive human settlement outside caves and caverns, its first main sources are in Southwest Asia and North Africa²⁰, and important details have emerged about the transition of primitive humans in the Algerian sahara to take the pattern of settling in dwellings outside caves and caves, as this was represented through rock art and was interested in conveying those details of his diary about them, of which his life inside the dwelling was one. This is reflected in rock art, and he was interested in conveying those details from his diary, of which his life inside the dwelling was one of them, as the change in the planning pattern in their construction is clearly evident according to these rock drawings studied by researchers such as Henry Lott and more recently by the researcher "AUMASSIP" from the circular plan to the oval, square and rectangular plan²¹. (Plate 01)

Panel 01: (Some examples of dwelling forms through rock art)



Source: Obrahim Johar, Dwelling through the rock paintings of the Tassili Asger

It is worth noting that similar studies in the Upper Mesopotamia region, map (02), and in excavations of archaeological sites dating to approximately the same period, i.e. from the Middle Transitional Period that preceded the Neolithic period, revealed the pattern of architecture with a circular plan that is considered the oldest in the region. The researchers believed that the origin of these dwellings is a simple pit that primitive man used to make it

¹⁹ Aubrahim Djouhar - Dwelling through the rock paintings in Tassili Azjar - published article - Institute of Archaeology - University of Algiers 2 - p. 8 - 9 - link : <https://www.asjp.cerist.dz/en/downArticle/210/13/2/44487>

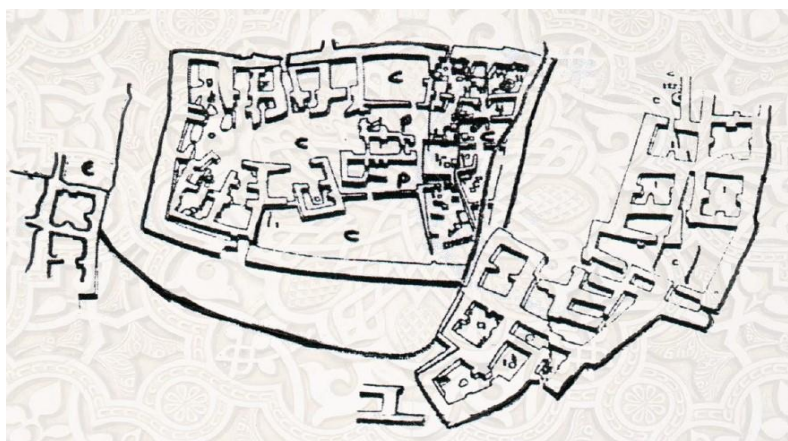
²⁰ J. Hawkes - L. Woolley - tr : Yusra El-Gohary - Lights on the Neolithic - three chapters translated from the book Prehistory and the Beginnings of Civilisation - 1st edition - Dar Al-Maarif - Cairo - Arab Republic of Egypt - 1967 - p. 85 - 86.

²¹ c. Hawkes - L. Woolley - Ibid - p. 10 - 12.

circular in shape to create a simple dwelling sufficient for a small family. Russian researchers also conducted a stratigraphic survey in northern Iraq, through which they confirmed that this is the same stage in which the nomads moved from the first shelters and settlements built with wood and branches to the construction of stable dwellings that continued to appear in the Neolithic period from 9000 BC to 7600 BC, and these dwellings shared that they had a depth of 1.5 metres underground, 5 metres.²²

At this stage, the first agricultural settlements began to appear in the Near East in the form of medium and small camps with an area of no more than 600 m², as in the Zarzi, Hazar Mard, and Shanidar regions in northern Iraq, Dederia in northern Syria, and Okazini, Karin, Balbasi, and Baladepe in southeastern Turkey, the first human groups that practised agriculture in the world and domesticated animals, marking the beginning of the Neolithic revolution. In Southeast Turkey, these were the first human groups to practice agriculture in the world and domesticate animals, marking the beginning of the Neolithic revolution, marking the transition from hunter-gatherer villages to farmer villages.²³

Fig: 01 Plan of an early primitive settlement dated 5400 BC 5250 BC



Source: Taha Ahmed Farwan: Prehistoric Architecture

Studies have shown that the size of early Neolithic settlements generally ranged from 0.5 hectares to 1 hectare, expanding in later stages to up to 12 hectares, with the same circular and sunken building pattern repeated in the same locations.²⁴

²²Gomaa Hariz Al-Talbi - The transformation of the house plan from circular to rectangular in the Neolithic period in the Upper Mesopotamian region - Ain Shams Literary Annals, vol : 48 - April-June 2020 - Ain Shams - Arab Republic of Egypt - p. 398.

²³ Gomaa Hariz Al-Talbi - Naeem al-Zaidi - Development of Settlement in Upper Mesopotamia in the Neolithic - Pre-Pottery (1000 - 6000 BC), published article - p. 05 - Link : https://www.researchgate.net/publication/334170992_ttwr_alastytan_fy_aaly_blad_alrafdyn_fy_alsr_alhjry_alhdyth#fullTextFileContent

²⁴ Gomaa Hariz Al-Talbi - Naim al-Zaidi - Ibid - p. 12.

Map (02) Location of the Upper Mesopotamia region, which witnessed the emergence of the first human agricultural villages and settlements following the beginning of the Neolithic period (Researcher Edited)



Source: Juma al-Talbi - Naeem al-Zaidi, Settlement Development, p. 14.

In the Sahara Sahara, including the Algerian Sahara, the African Negro element emerged among the most populous people who lived there, and their influence was noticeable on all patterns of life there, especially in terms of architecture, whose features they transferred to the region in its earliest features. Before that, rock art references have given us many clues in this regard, as many researchers headed by Henri Lott, Lajo and researcher Leroy Goran in his book: (The Negro Character of Human Forms). These studies covered many sites such as Sifar, IN ITINEN, TEN TENZREFT and AUANRHET in the Tassili Najr. Another team studied and categorised human remains in the region, the most important of which were the inventories carried out by L. Balout's inventories of the human remains found in the Hoggar region in Tamanrasset, which were resumed by R. Mouny, all of which confirmed the Negroid component of these remains, with some very few exceptions for some elements that settled in primitive dwellings near the banks of the lakes, but despite these few indicators, there are no clear signs of a permanent settlement in North Africa early on, and the so-called formation phase that witnessed the widespread emergence of stability and agricultural presence generally dates back to a late date to about 4000 BC.²⁵

The Algerian sahara continued to witness uninterrupted urbanisation throughout all its subsequent periods, as many tribes such as the Getul, Afuras, Gramans, Libyans, Tuaregs and Berbers passed through it, each according to their ways of living and coexistence, which was later reflected in the formation of the first nucleus of the emergence of a new style of architecture in the Algerian sahara.²⁶

²⁵ Ian Tattersall - Translated by : Hazem Nahar - The World from the Beginnings to 4000 BC - 1st edition, Abu Dhabi Authority for Culture and Heritage - Abu Dhabi - United Arab Emirates - 2001 - p. 192.

²⁶ Ali Ghabazia - The society of Wadi Souf from the dawn of history to the late Middle Ages - 1st edition - Dar Sami for Publishing and Distribution - Wadi Souf - Algeria - 2023 - p. 71.

To sum up, civilisation from its earliest times in Algeria, which covered its vast sahara, was influenced by several civilisations from afar, which led to its classification into local, often called the Getulian culture, one of the manifestations of which is architecture, and other parts of it called the Saharan civilisation, which settled in the Rig Valley and the Mizab Valley, and imported, with influences from the civilisation of the ancient Egyptians and to a lesser extent from southern European civilisations.²⁷

It is important to note that most of the influences on the cultural aspects of the local civilisation in the Algerian Sahara came from the east and the south, leading to a cultural accumulation that affected the style of architecture as one of the cultural manifestations.

2. The Origins of Saharian Ksours

The emergence of Saharian Ksours near permanent Valleys and agricultural fields from which various fruits are harvested is a simulation of the life of primitive man in the Neolithic period beginning 8000 years ago, and in the late Neolithic period until 2000 BCE, especially in the phase of round heads expressed in rock art, as we saw earlier, where he was characterised by the emergence of agricultural villages that he used as a place of residence and human gathering, on an economic basis based on the practice of agriculture in the fields and farms of those villages that spread in the valleys extending between the valleys. It was characterised by the emergence of agricultural villages that he used as a place for his residence and human gathering, based on an economic basis based on the practice of agriculture clearly in the fields and farms of those villages that spread in the valleys between the mountain ranges, and in the areas where he descended from the caves for the first time, which explains this pattern of similarity and the inheritance of this method.

The construction of permanent villages was a characteristic feature of the early Neolithic period, characterised by an agricultural economy. There is evidence that mud shelters and buildings did not change in the sahara during this period, but they did spread around water sources, an expansion not seen in the sahara in previous eras.²⁸

The penetration of the Negro race into the sahara from the depths of Africa influenced the local civilisational culture in all its aspects, especially the aspect of architecture, as evidenced by the emergence of the first types of architecture with African influence, which is classified as African architecture.

²⁷ Mohammed Al Ani - Ibid - p. 27.

²⁸ Baitich Abdelhamid - The relationship of Tasilian man with the natural environment in the Neolithic period - a study through rock painting scenes - Journal of Social Sciences and Humanities - No. 04 - July 2013 - p. 128.

African architecture

It appeared in the Getulian period (100 BC / AD), where the Getulians settled the sahara and were described by Herodotus as a white population engaged in various professions. At this stage, the architecture was clearly influenced by African architecture, and its features include the conical and pyramidal shape, as it was built on peaks, heights and plateaus, and used limestone, humus stone and salt stone that was brought from the marshes in its construction.²⁹

2.1 The Origins and Development of the Architecture of the Ahgar Region from Primitive to the Emergence of sahara Palaces

The Tadrouk region in the Hoggar, in the south-east of the Algerian sahara, is one of the regions that witnessed the early beginnings of human settlement in the region, where the nomads "Ibmohag" arrived and began to colonise it, and the colonisation continued through stages that developed the type of housing and the city alike, until the construction of sahara palaces as an architectural and urban pattern necessary to cope with the rapid changes in the sahara's climate.³⁰

The dwelling in the Ahgar region evolved, starting with the use of the tent, which was made from the skins of animals hunted by the Tuareg, such as the mouflon (mouflon), these skins were erected on stakes, and the tent was named Ahkit.³¹ **Image 01 of Plate 01.**

The tent then evolved into what is called a "**zriba**", which is referred to in the local dialect of the Emohag Bedouin as a zariba: "Akbar", an extension of the tent, appeared when the nomadic Bedouins began to settle down and gradually abandon their constant wandering. When renovating an old "Akbar", they destroy it and use the same materials to build a new one on its ruins, but with a larger area, and its pillars are made of **Tamarix** tree trunks (Photo 02 of Plate 01).³²

A new type of dwelling, the so-called "damos", inspired by the tent in terms of area, is similar in shape to the zebra, but it is installed in a square-shaped pit, usually up to 50 centimetres deep, prepared with bricks and stones and roofed with the same type of roof as the zebra.³³ See (Photo 03 of Plate 01).

These houses consisted of large rooms divided into two parts, with a rectangular plan that later evolved into a roofed and open plan, and an open internal courtyard, where for the first time the separation of functions such as cooking, receiving guests, and sleeping was recognised, reflecting the evolution of families' living conditions.

²⁹ Mabrouk Moghaddam - The emergence of palaces and land architecture in the regions of Touat and its environs - 1st edition - Diwan of University Publications - Algeria - 2016 - p. 73.

³⁰ Karzika Ali - The evolution of housing patterns among the Tuareg of Ahgar - Tadrouk as an example - a historical-archaeological-urban study - Master's thesis - Institute of Archaeology - University of Algiers - 2008/2009 - p. 49.

³¹ Ibid - p. 51.

³² Ibid - p. 52.

³³ Ibid, p. 53.

Beginning in the 18th century AD, sahara palaces began to emerge in the region as a new type of architecture, with the construction of Tamengiste and Tazruk Palace at an intermediate distance from each other, respectively, and the foundation of the "Amonkal of the Hagar" (Aq Amstan) built the Tazruk Palace, which was completed at the beginning of the 19th century AD.

Plate 02: Examples of dwelling forms in the Tawazruk region (Ahgar) and their evolution in the Algerian Sahara



Picture : 02 Zariba « Akbar" in the Ahgar region "Tawazruk" about Karziza Ali



Picture : 01 Tent "Ahkit" in the Ahgar region "Tawazruk" About Karziza Ali



Picture : 03 Tent "Ahkit" in the Ahgar region "Tawazruk" About Karziza Ali



Picture : 04 Tent "Ahkit" in the Ahgar region "Tawazruk" About Karziza Ali

Source: Karzika Ali, 2008/2009, pp. 49-56 Adapted by the researcher

2.2 The Emergence and Development of Sahara Palaces in the Algerian Eastern Sahara (Low Sahara):

In the Numidian era, some palaces were established in various areas of the Algerian Low Sahara in the regions of Wadi Rig, Wadi Mia, and the Zab region. Hassan al-Wazzan, known as the African Leon in his book "Description of Africa", mentions a description of the city of Touregt called "Techort" and its palaces, and that the Numidians were the ones who founded it, even if he suggested that the Romans may have contributed to its construction due to the great similarity in some of its buildings, which used stones that are alien to the place with the pattern of Roman construction in some types, which may have been brought

from quarries somewhere.³⁴ There is no doubt that the palace referred to in this description is the "Ksar of Mastawa", to which these characteristics apply, and it is worth mentioning that Ptolemy had also named "**Le Turaphylum**" for the region of Toghrt and its ksours, and described it as a fortified citadel consisting of 600 dwellings built on a hill in the sahara.³⁵

2.3 The emergence and development of Saharian Ksours in the Touat region in the south-west of the Algerian Sahara

The Touat region is considered the region with the most Sahara palaces, with about 300 Sahara palaces. The styles of these palaces varied according to form, function and nature, which made researchers strive to classify them according to these variables, and perhaps the ethnic groups contributed to the construction of these palaces and imparted their own characteristics to them:

Berber architecture

This architecture is characterized by its location in high places, built with stones and clay, which are local materials, but its internal architecture is different and its internal space consists of very narrow and winding alleys and winding dwellings that connect directly to the outer wall. These cities and palaces are devoid of a spacious central area, with corner towers at the corners, clearly highlighting the defensive character of this type of palace.³⁶

Arab-Islamic architecture

Arab-Islamic architecture in the Algerian sahara has known stages during which it gradually spread according to the historical events that took place in the region that resulted in these transformations in the character of architecture as a whole. The stages of the emergence of sahara palaces with an Arab-Islamic character can be divided as follows³⁷:

- a) The Almoravid stage (1146 AD 1147 ——— AD): the Lemtuns, sons of King Yusuf ibn Tashfin, led this phase when their state was broken in Morocco and Andalusia, where they retreated to the land of Tuat on the western side of the Algerian sahara, and began to establish their palaces.

³⁴ Hassan al-Wazzan - Description of Africa - T2 - Part 1 - Dar al-Gharb al-Islami - Beirut - Lebanon - 1983 - p. 135.

³⁵ Henri Fournel- Richesse Minérale de l'Algérie. Accompagnée de Claircissements Historiques et Géographiques - Tome 1- Imprimerie Nationale - Paris - 1846- p340.

³⁶ Thiaga Siddiq-Fatihi Abdelghani, The Architectural Style of the Saharan City and its Social Functions, article published in the Journal of Humanities on/ International Forum on Transformations of the Saharan City - Intersection of Approaches on Social Transformation and Urban Practices, held on 03/04 March 2015, Faculty of Humanities and Social Sciences, Kassidi Mrabat University Ouargla, p. 113.

³⁷ Thiaga Siddiq - Fatihi Abdul Ghani - Ibid - p. 114.

- b) The second phase (1147 AD 1316 ——— AD): This phase was characterized by the arrival of many Berber tribes from the north, who were skilled in trades and professions such as carpentry, blacksmithing and perfumery.
- c) Third Phase (1316 1483 ———): This phase saw the arrival of more Berber and Arab tribes to the Sahara, building more palaces in large parts of the sahara, where they experienced great prosperity at the time.

Factors in the emergence of sahara palaces

There is no doubt that the emergence of sahara palaces in the Sahara Sahara in general and the Algerian Sahara in particular was due to the convergence of multiple circumstances that led and contributed to this, and because sahara palaces are considered an architectural phenomenon that spread in many different places but are similar in the environment to which they belong, every phenomenon has surrounding circumstances, causes and factors that together lead to its formation, development and extension. It can be said that the Algerian sahara has been throughout the ages a hotbed and destination for human migrations, as we have seen above, and with the continued availability of the goals sought by human builders throughout each era or historical period, and despite the change in its climate to become very harsh and dry, the emergence and localization of these Sahara palaces in the places where they are was determined by special factors that can be presented below:

Economic factors

The sahara caravan trade routes played an important role in the location of sahara palaces in places that are considered strategic and logistical in the language of the modern world due to the services provided by these palaces to the visitors and passers-by of these routes, especially in terms of security and supply for them, and it is known that one of the conditions for the establishment of palaces is the availability of a source or source of water sufficient for its inhabitants and visitors to supply and benefit from it, and the Algerian sahara has known the crossing of many axes of the caravan trade routes that were linked to centres and cities of great renown, and the most prominent stations of the caravan trade routes are the Touat region, which was characterized by its important location in the middle of the Algerian Sahara. One of the most prominent stations of the caravan trade routes was the Touat region, which was distinguished by its important location in the middle of the Algerian Sahara, where more than 370 Sahara palaces are counted, which in themselves constitute a straight stretch that provides a safe path for all passers-by because of the proximity of these palaces to each other and the conditions that make them a destination, which made them retain this great status for hundreds of years. See Map 3.

Map 3: Caravan routes from 500 BC to 1900 AD.



Source: <https://www.guidopicardi.com/en/portfolio/kanem-bornu-and-the-trans-saharan-trade/>

Environmental Factors

In the science of engineering and all related concepts of architecture and urbanism, it is necessary to define concepts of the intended environment when discussing the issues of its influence and impact on this architecture, its development and its becoming a continuous urbanism that has a continuity that requires sustainability as it is called in the concepts of this era, and the environment is of two types according to the viewpoint of architecture and urbanism, a natural environment that is created by God Almighty, and an environment created by man. In both cases, the impact of this environment appears on the patterns and forms of sahara palaces, determining the type of their architecture and the details of their architectural elements from the largest components such as streets, their directions, windings, narrowness and spaciousness to the smallest ones such as windows, their directions and locations, types of roofing and building materials used in these elements.³⁸

Human factors

Human beings are considered the most influential actor in the emergence of civilizations and the manifestations they know, such as urbanism and architecture, so it must be said that the architecture of Sahara palaces is an intellectual product between individuals and groups in one society or societies that are close or far apart in space and time, and it is the result of their convictions as producers of this architecture. It was not crystallized once, but was the result of integration and experiences passed on between human generations that led to its crystallization into a set of systems that rely on the principle of trial and error and its

³⁸ Faisal Shashmir - Environmental Characteristics of Kasbah Architecture - Second Engineering Conference - Faculty of Engineering - University of Aden, Republic of Yemen - 30 - 31 March 2009 - pp. 231 - 242.

correction leading to improving its effectiveness in confronting the climate and various Sahara dangers, while ensuring the embodiment of social values and ties between them.³⁹

Conclusion

In general, we can conclude unequivocally that the Algerian sahara has never been devoid of its inhabitants from the first signs of human civilisation until the present time. Many generations have inherited the lands of the sahara and the ever-changing conditions and environment, and with each change they have added touches in their daily lives to cope with these conditions. Among the things that have been passed on between these generations are the methods and techniques of constructing sahara dwellings, villages and cities, from their primitive forms to the emergence of an architectural style, the sahara palaces, whose builders agreed that they are the only model that can not only challenge the harshness of the sahara but also the possibility of surviving for a very long time despite the simplicity of its raw materials.

The following points can be learnt from this study:

-  The Algerian sahara has witnessed multiple human migrations throughout its history, which brought many influences on the forms and patterns of life, especially architecture.
-  The first nucleus of architecture is Upper Mesopotamia, which represents the first nucleus of architectural features that came to North Africa, and these features "exploded" in the Neolithic period through repeated human migrations along the same line Upper Mesopotamia - Sahara (specifically the central part of it towards the north), north of the Algerian Sahara until the foothills of the Atlas Mountains).
-  These migrations left their imprint, which can be seen today in the traces of the use of the arts and techniques of architecture that are common to many architectural phenomena, especially sahara palaces, which in some of their features translate the touches of some of those who made these migrations.
-  Many clues to the persistence of commonalities between the architecture of the Algerian Sahara in its early beginnings and what continued later on can be found in the persistence of the same commonalities in the construction and organisation of Sahara palaces.

³⁹ Al-Amoudi Al-Tijani, The relationship between urbanisation and man in desert palaces, Journal of Media and Society, Volume (03), Issue (02), p. 28.



Many of the determinants of the morphological forms of Sahara palaces, such as the origin of their builders and their influence on the cultural neighbourhood of the regions in which they were found, left their architectural manifestations observable, and this will lead to their classification according to these determinants.



Since at least the Neolithic period, the Algerian sahara has not been devoid of a population of diverse origins, nor of different types of architecture and urbanism, which responded to the gradual change in the nature of the sahara by adapting the methods and arts of creating this architecture in a similarly gradual manner until the adoption of an architectural phenomenon, the sahara palaces, to respond to these changes while retaining the same patterns.

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