

People's Democratic Republic of Algeria



Natural hazards and cultural heritage: preservation STRATEGIES IN Algeria

CASE: The M'Zab Valley The Story of an Architecture Between
Authenticity and Modernity

presented by:

Dr. Arq; MAROC MOURAD

- TODI (ITALY) 19-26 JULY 2026 -

I

A

:

est un

oui

Où

la
nature

a dit

non. 1

Geographic situation



The M'Zab Valley is located 600 km south of Algiers—specifically, between 33° and 31° 15' North latitude and between 2° 30' and 5° East longitude. This region spans a dry, arid desert valley. It is known as the M'Zab "Chebka," as it features a rocky plateau deeply furrowed by wadis.



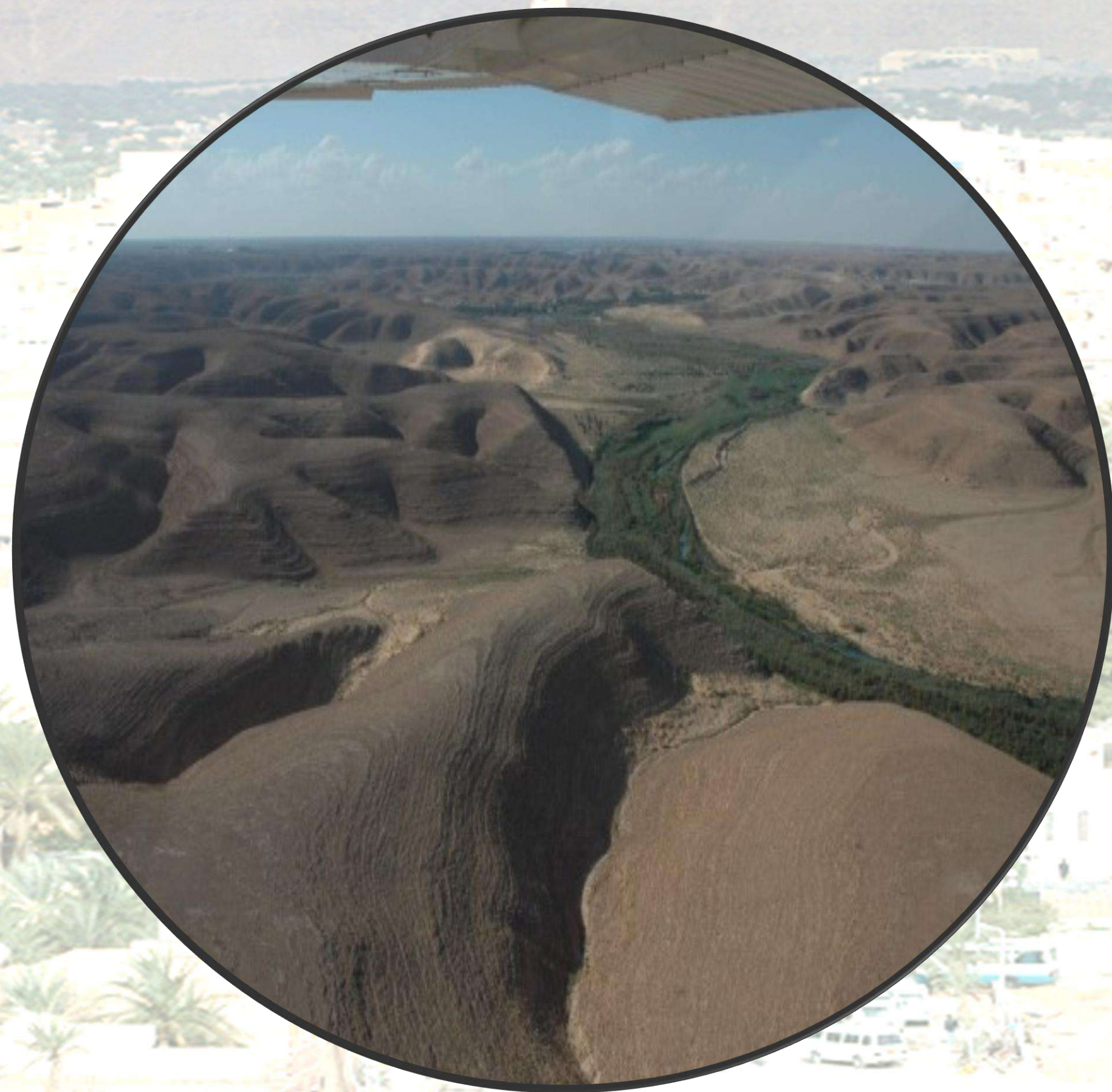
HISTORY

Les origines des kharidjites :

➤ les habitants de la vallée, ou mozabites, sont des musulmans schismatiques ou **kharidjites**, le schisme auquel ils se rattachent date du VI^{ème} siècle et a pour origine la succession de prophètes.

➤ Ali proclamé khalife après les trois premières élections lors de cette succession. Muawiya gouverneur de Syrie prétendant au khalifat entra en guerre contre Ali .

➤ Au cours de la bataille de Ciffin en 657, Ali, en vue d'éviter une effusion de sang, certains partisans d'Ali refusent l'arbitrage qu'a proposé Muawiya et c'est ce groupe qui fit scission.



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

POSITION



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

G

H

A

R

D

A

I

A

:

est un

oui

Où

la nature

a dit

non.



CITIES OF THE VALLEY:

MELIKA

BOUNOURA



GHARDAIA

BENI ISGUEN



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

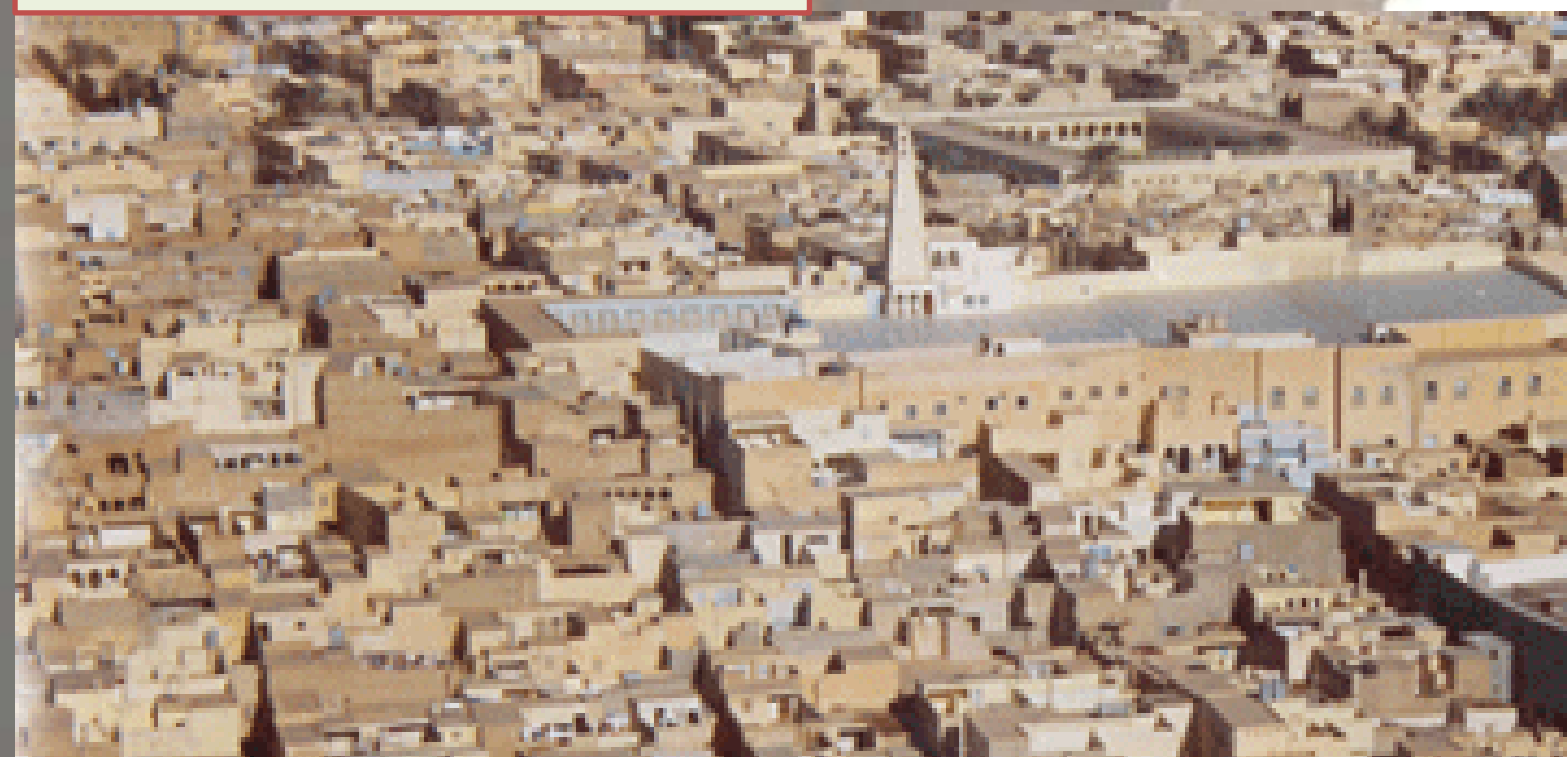
non.

ATTEUF



EXTRA MUROS PART

GUERRARA



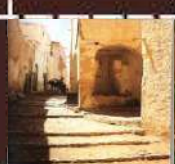
BERRIANE



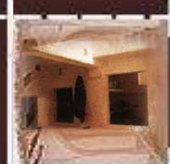
I



A



:



est un



oui



Où



la
nature



a dit



non.





G



H



A



R



D



A



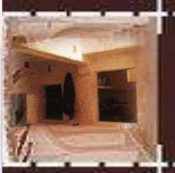
I



A



:



est un



oui



Où



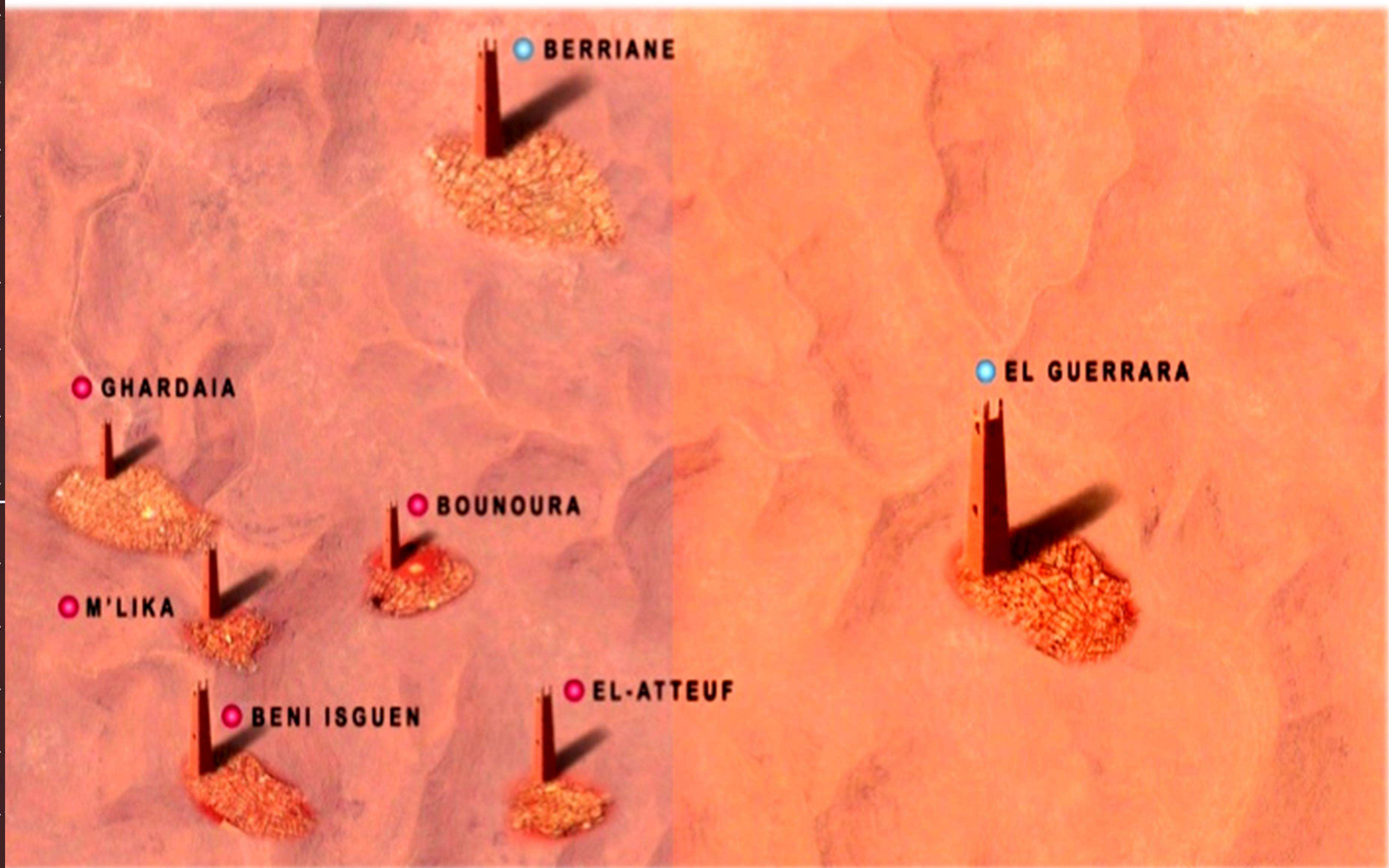
la nature



a dit



non.



The Cities of the M'Zab

- *The city walls are the first thing to be built. Mozabite cities are built on mounds, hills overlooking the wadi. The mosque comes first, before any other dwelling, generally at the highest point of the city. Around the mosque, then, come the dwellings, and only dwellings, which descend to the ramparts where the market (souk) is located.*

G

H

A

R

D

A

I

A

:

est un

oui

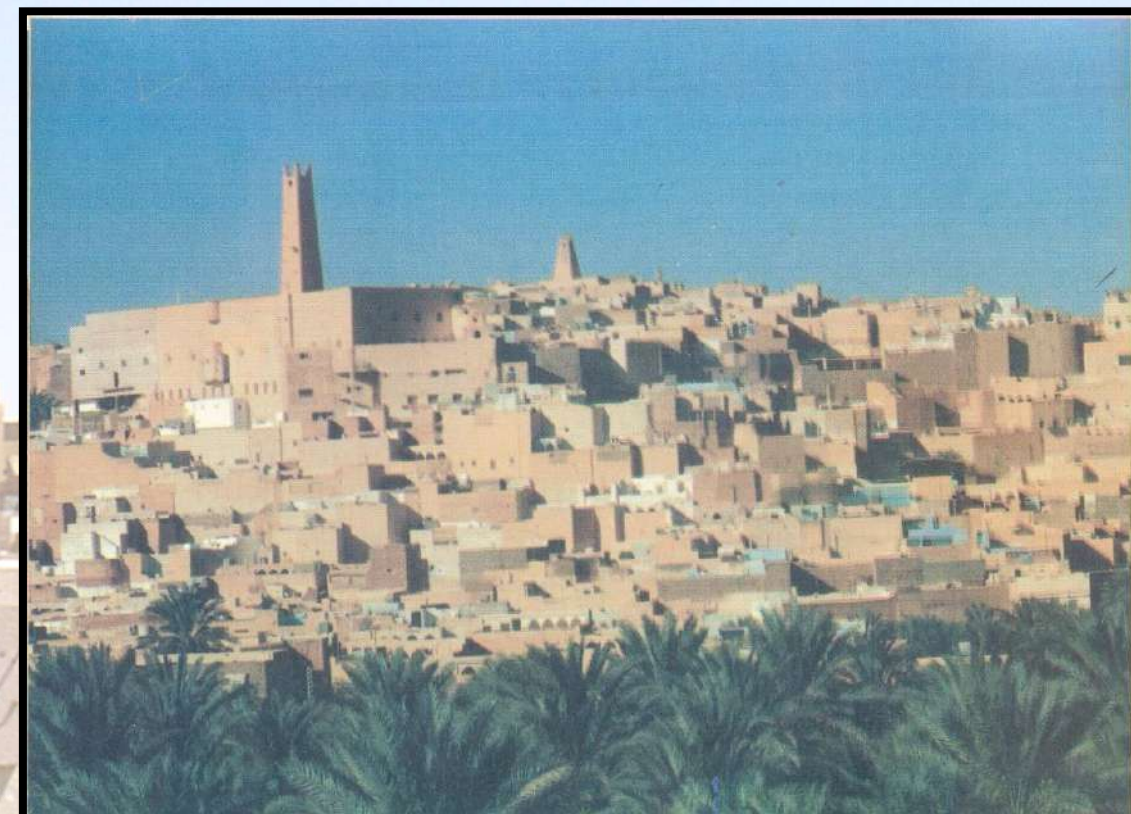
Où

la
nature

a dit

non.

El Atteuf (le tournant-tajnint)



➤ *Founded in 1012, this ancient and mysterious city is the oldest in the M'Zab Valley. It is unique in having two Ibadite mosques and two minarets. Located at the lower end of the Pentapolis and somewhat isolated from the other ksours, El Atteuf is today a struggling city due to its geographical location.*

I

A

:

est un

oui

Où

la
nature

a dit

non.

Mélikā (At-amlichet)



- *It was founded in 1017. The Ibadite mosque is located in the center of the town, and the souk (market) extends at its base. Its palm grove is practically nonexistent, but the inhabitants of Melikā own numerous gardens in Metlīlī. Its population of 2,829 includes an Arab contingent originating from Metlīlī..*



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

Bounoura (la lumineuse-AtéBunur)



- It was founded in 1048 by the Beni Madhhar, like El Atteuf. It is entirely protected by the rocks that line the M'Zab wadi and are topped with fortified houses.



I

A

:

est un

oui

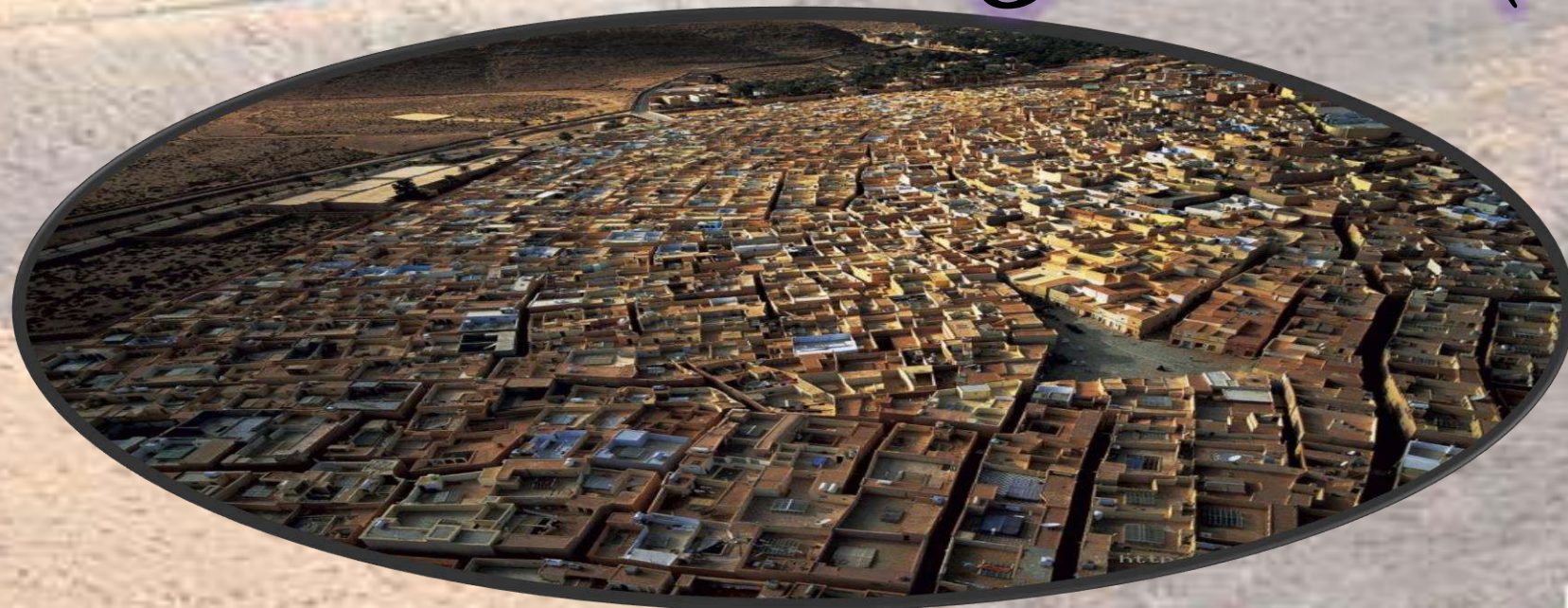
Où

la
nature

a dit

non.

Béni Izguene (At-Isguen)



➤ *A holy city, founded in 1050 on the side of a rocky hill, it remains surrounded by a vast rampart topped with towers and pierced by only three gates, which until recently were closed to foreigners. The palm grove stretches along the N'Tissa wadi for three kilometers and contains some 25,000 palm trees. It also boasts a very popular daily auction market, a kind of craft fair.*



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

Ghardaïa (Taghardait)



(La ville de Ghardaïa)

- *Ghardaïa is the most important city in the M'Zab Valley, founded in 1053 by two Muslim saints who were brothers: Mohammed and Slimane Benyahia. The mosque, with its minaret shaped like a very elongated truncated pyramid, dominates the entire city. The Ghardaïa palm grove, located two kilometers upstream from the city, is by far the most flourishing in the Pentapolis, with some 60,000 palm trees. This city will be the focus of our study.*



I

A

:

est un

oui

Où

la
nature

a dit

non.

Guerrara (Lagrara)



It was founded in 1630. It is the most remote of the M'Zab cities, 100 km from Ghardaïa. This city, very significant for the desert (7,719 inhabitants), is located on the route of caravans traversing the Sahara from East to West and from North to South.



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

Berriane (Baryane)

➤ *It was founded in 1679 on the Bir River, 45 km north of Ghardaïa, by two groups expelled from the city of Ghardaïa. Like all the towns of the M'Zab Valley, it is built on a hill. It has its own mosque, its own market square, its own oases and palm groves.*



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

G

A

R

D

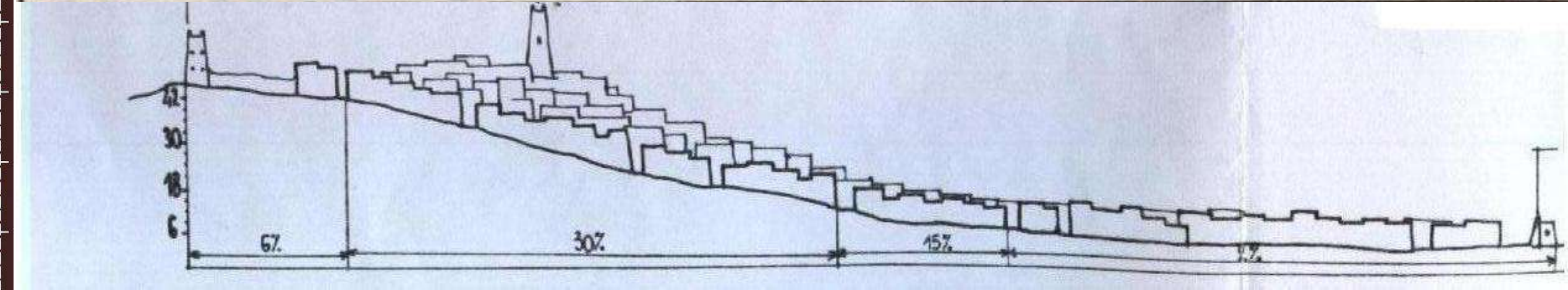
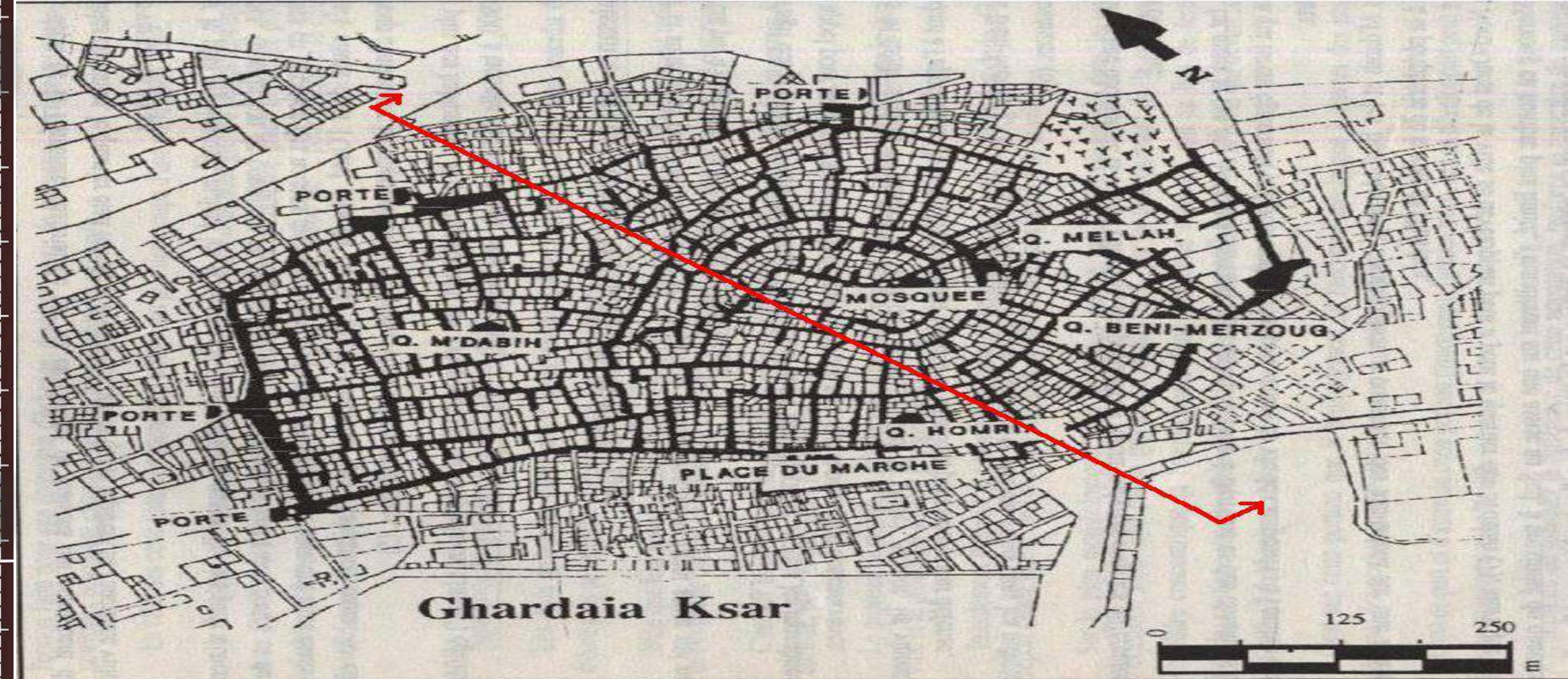
E

N



*L'organisation est centrée autour
de la mosquée*





	G	
	H	
	A	
	R	
	D	
	A	



The neighborhoods:

La ville comprend quatre quartiers, chaque entité avait sa propre mosquée.

Le quartier Juif (El Mellah):

Il est né avec la venue des Juifs aux abords de la ville en 1942 et qui se situe au sud-est du k'sar.

Le quartier des Beni Mer Zoug:

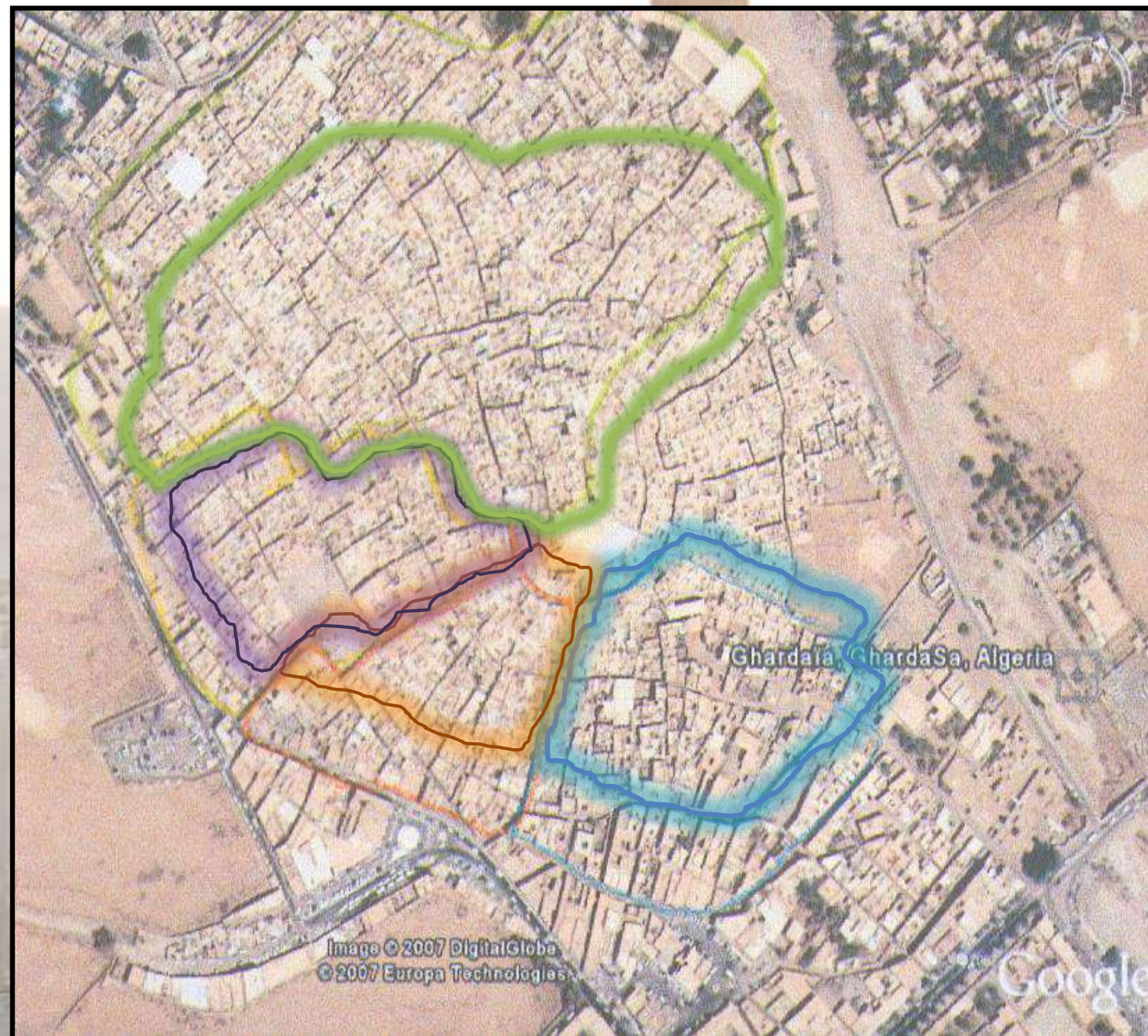
Nommé par la venue des Beni Mer Zoug en 1527, il est à proximité du Quartier Juif.

Le quartier des Mdabihs:

Sa population est originaire de Mettili installée au Nord-Ouest de la ville en 1586.

Le quartier des Homria:

Représenté par la place du marché.



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

Le système viaire

Le ksar possède un système viaire complexe et très hiérarchisé.



Rues
et
Ruelles
et
Impasses
et
Passages couverts



The streets:

Used by the Ibadite community, they have the least restrictive status. They range from 1.5 to 5 meters in width—allowing for the passage of one or two donkeys, the primary means of transporting goods within the ksar—and must be open at both ends.



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.



G



H



A



R



D



A



I



A



:



est un



oui



Où



la
nature



a dit



non.



➤ **Vue d'une rue de commerce
a Ghardaïa**

G

H

A

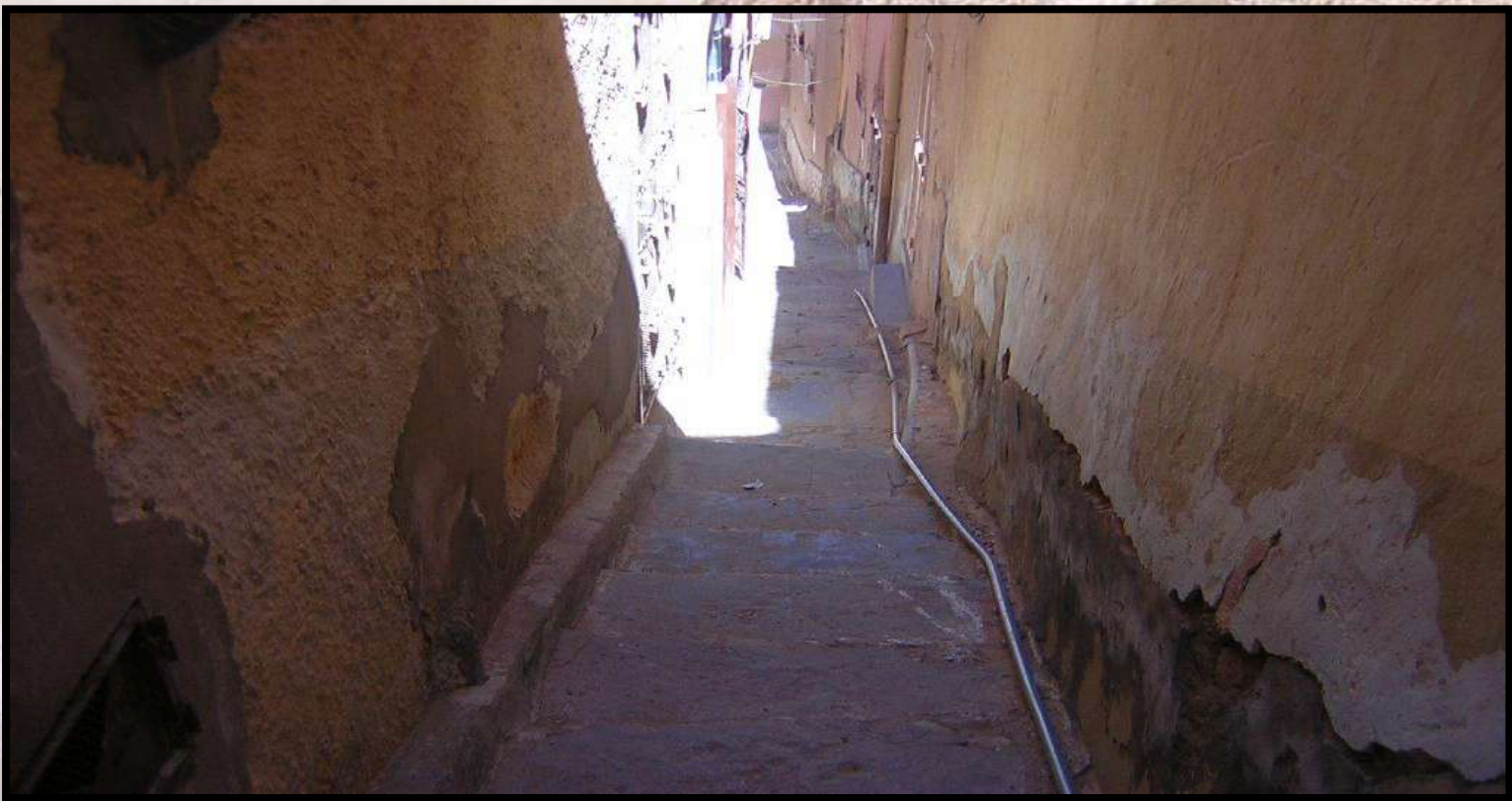
R

D

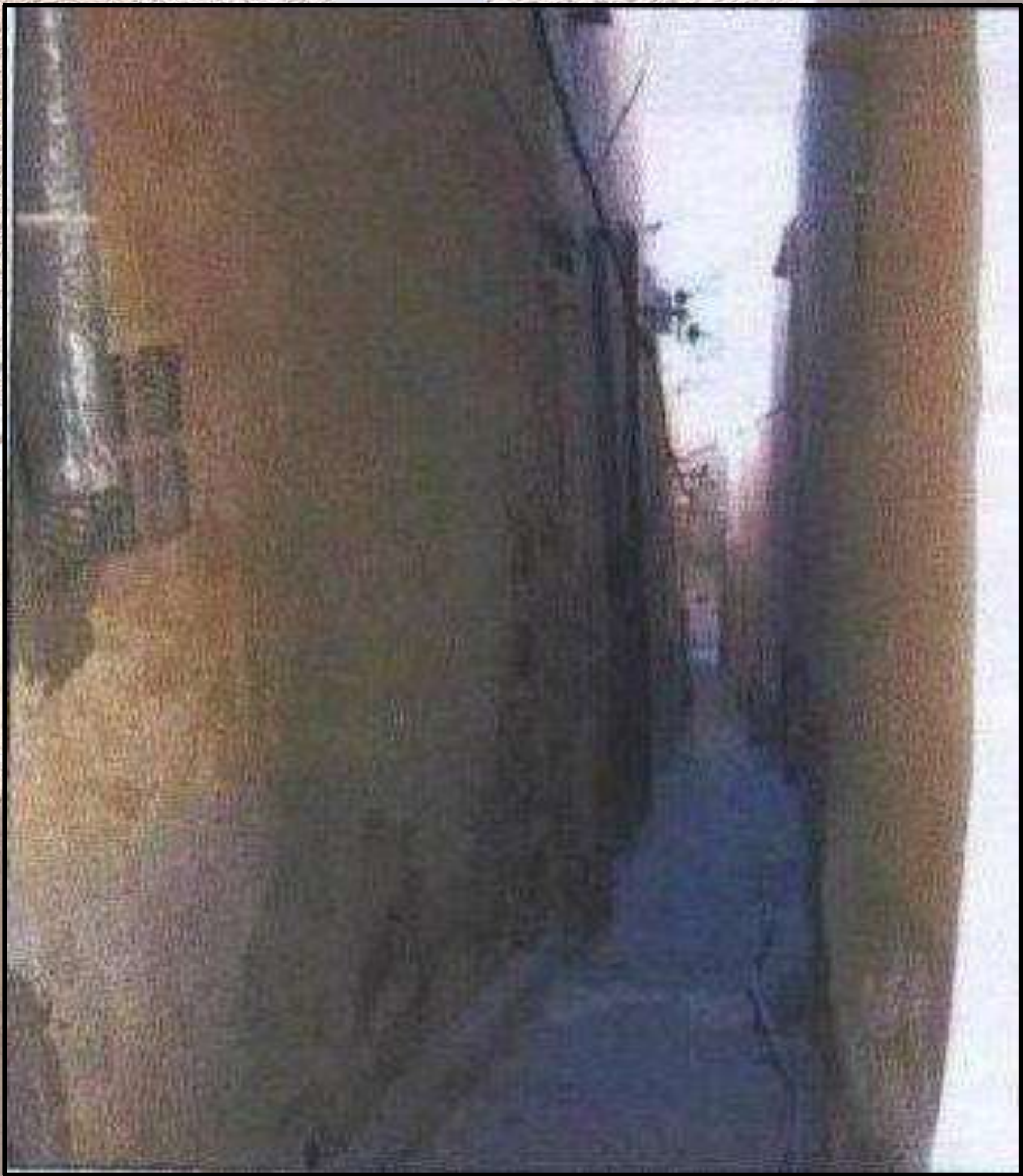
A

I

A



The alleyways (*sikka nafidha*):
Their layout is more winding than
that of the streets, and their width
consistently ranges between 1.5
and 5 meters.



I

A

:

est un

oui

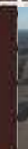
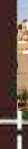
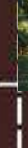
Où

la nature

a dit

non.

	G	
	H	
	A	
	R	
	D	
	A	

	G	
	H	
	A	
	R	
	D	
	A	



➤ COVERED PASSAGEWAYS:

➤ The construction of additional rooms above street level was once heavily regulated, but permitted for owners of very small plots and for owners of two adjoining houses, allowing them to increase their living space. Construction with cantilevers over the public right-of-way was severely regulated to prevent the darkening of streets.

G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

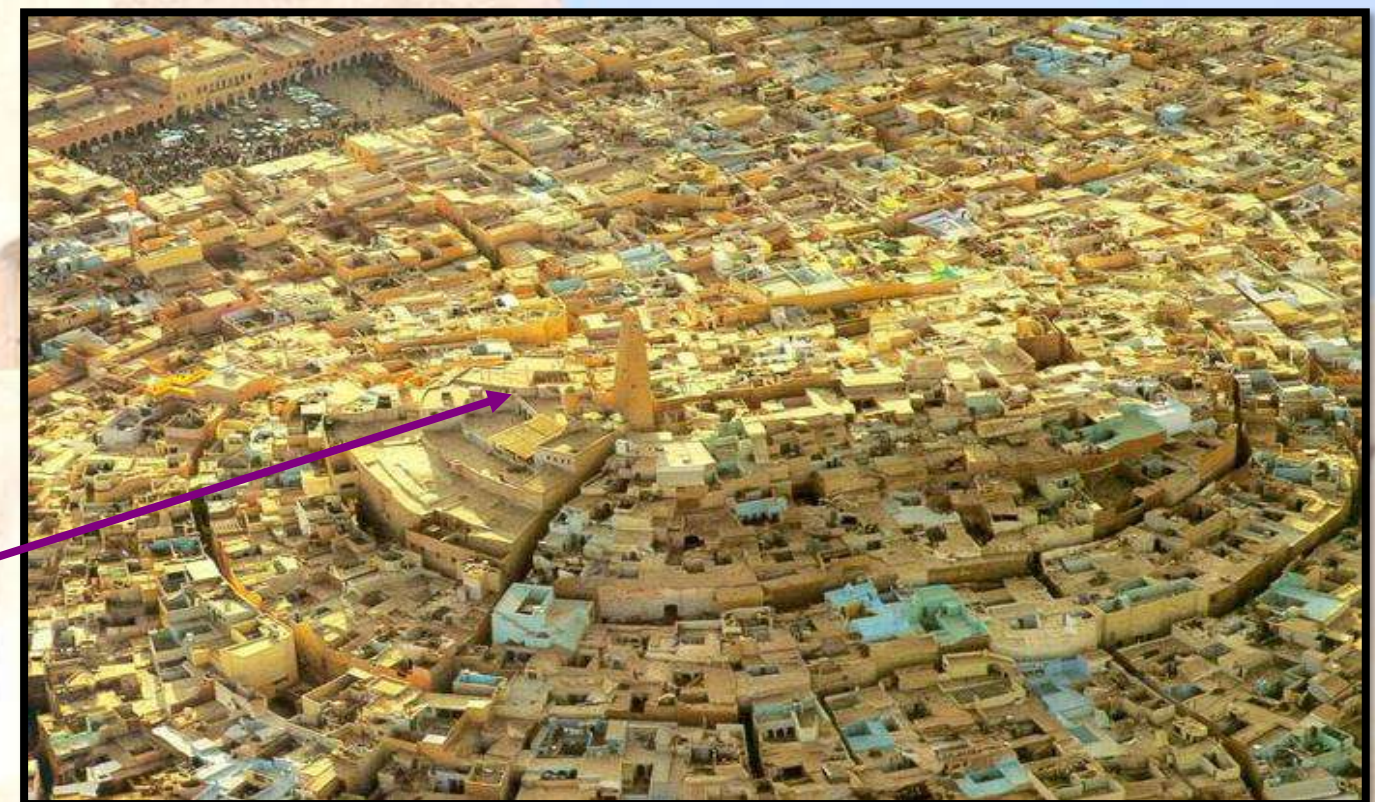
les composantes de la ville

La mosquée :

La mosquée est le premier lieu que les ibadites édifient dans leurs cités, c'est le lieu dans lequel se concentre toute la vie spirituelle et matérielle. C'est le lieu de prière, lieu de réunion des fidèles et de gouvernement de la cité.

La mosquée domine la ville par son minaret en forme de pyramide comme un doigt levé, on y voit aucune constatation, aucun ornement, ni élément décoratif.

Le minaret de la mosquée



La mosquée est au centre

G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

G

H

A

R

D

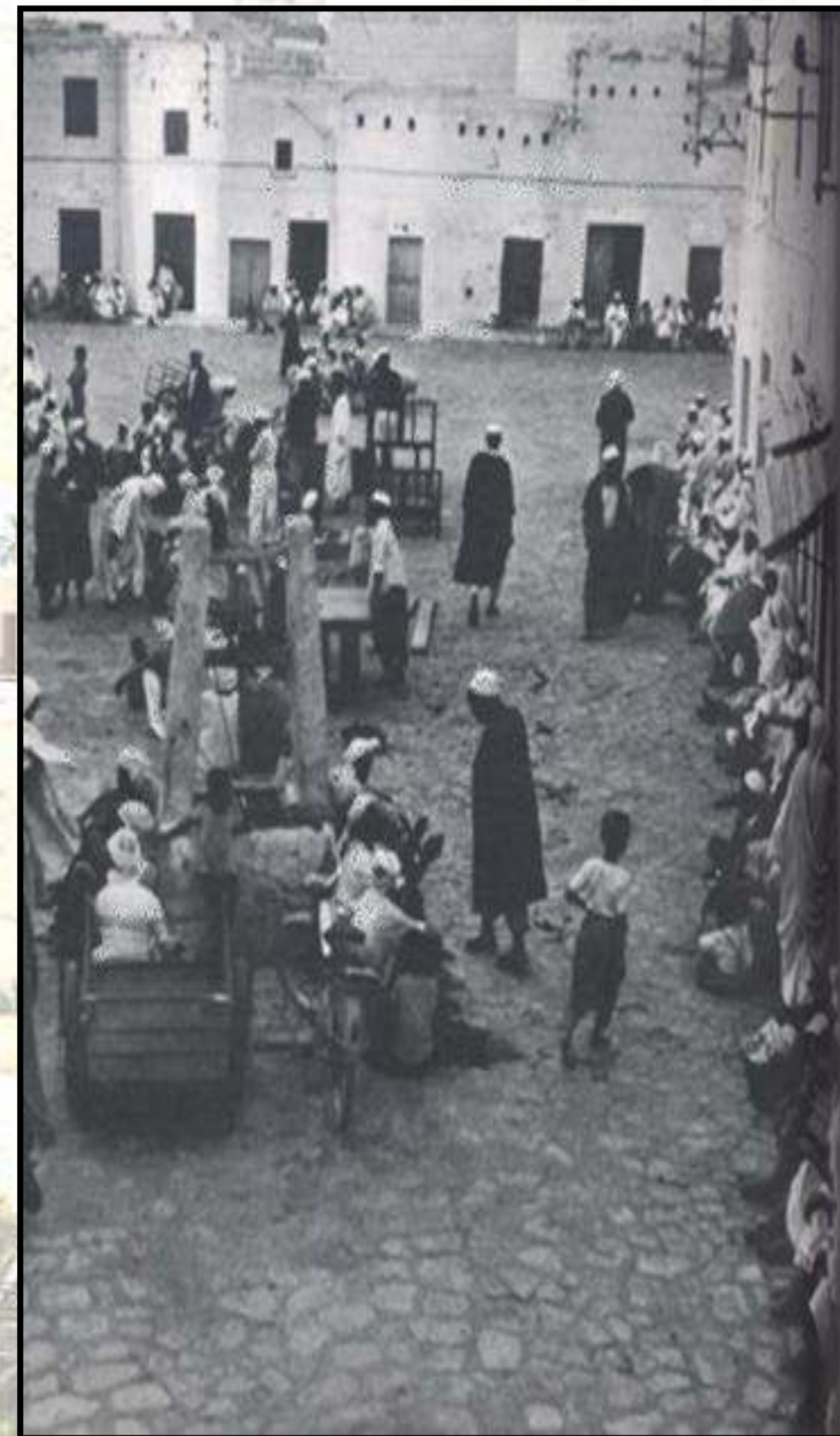
A

The souk:

The souk of Ghardaia, on the southwestern outskirts of the city, is the most important in the valley. Caravans used to come to sell their goods at the large Friday market. This rectangular square, approximately 75m by 44m, is entirely surrounded by a portico onto which shops open.



*La place de marché
est entourée de
maisons*



I

A

:

est un

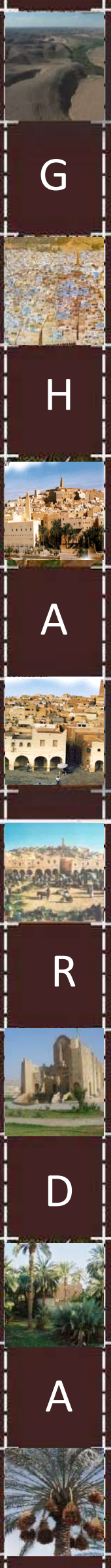
oui

Où

la
nature

a dit

non.



G

H

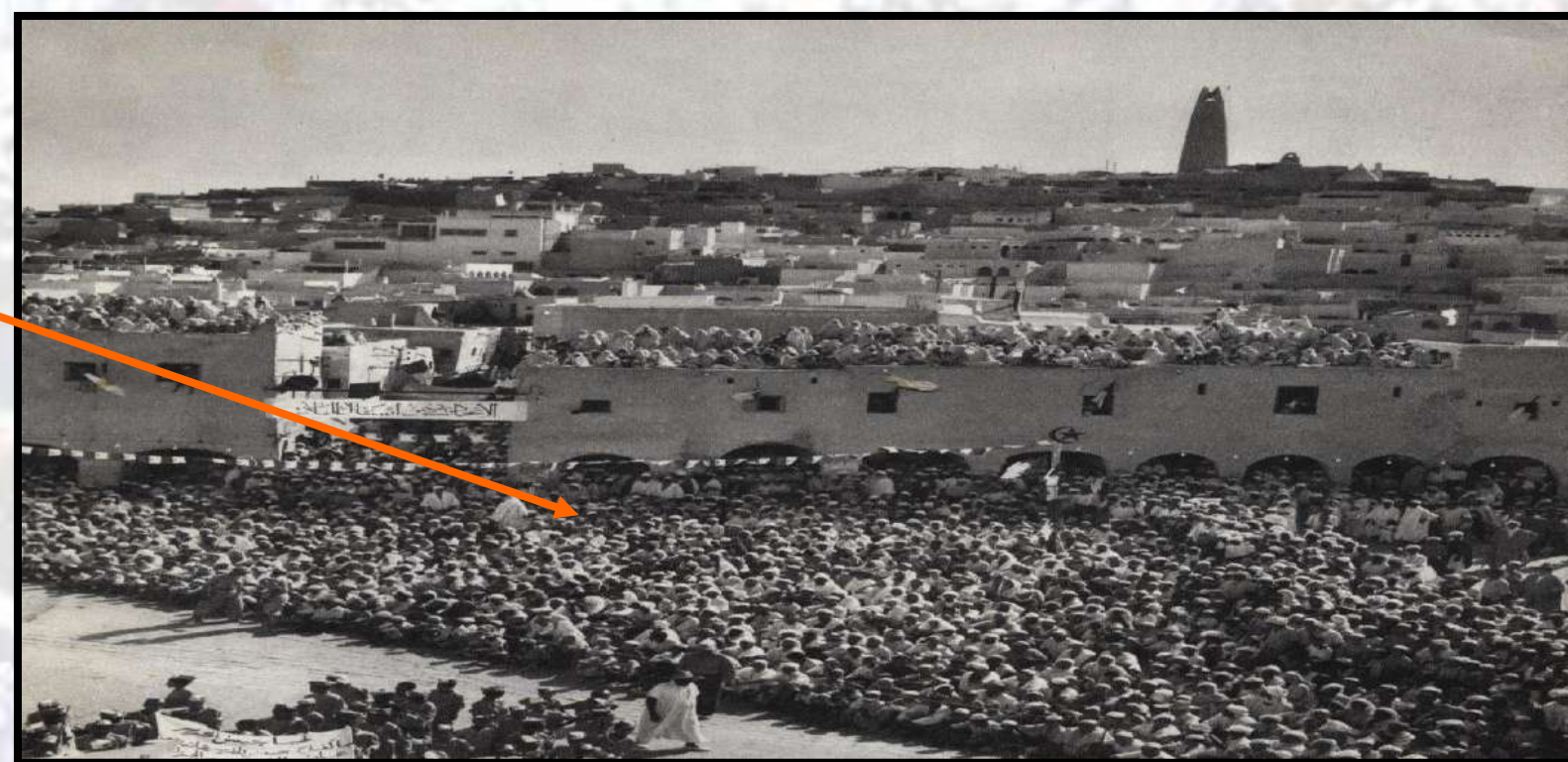
A

R

D

A

The marketplace also serves as an extension of the mosque, providing a gathering place for worshippers.



Market Place

I

A

:

est un

oui

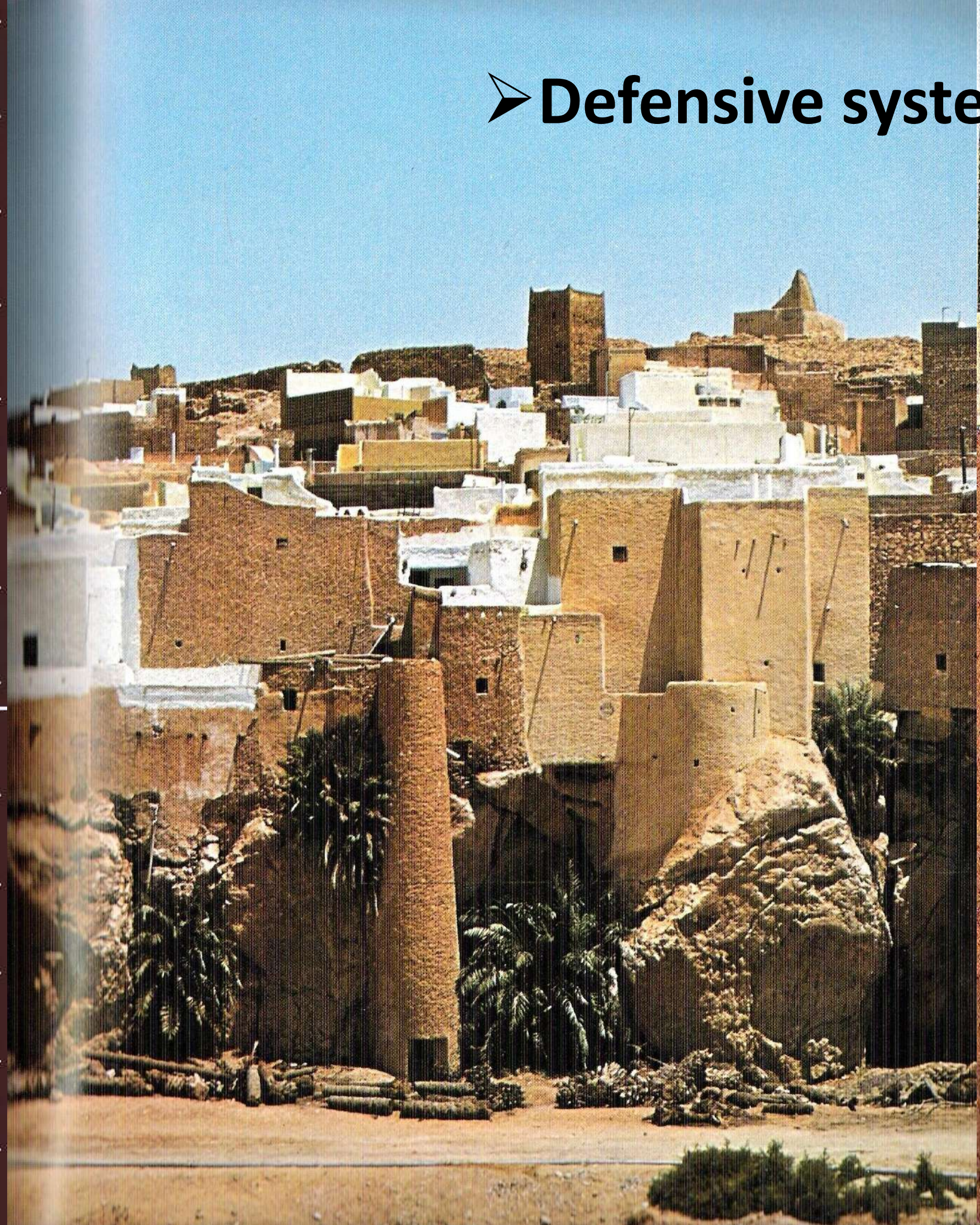
Où

la nature

a dit

non.

➤ Defensive system (fortification)



G

H

A

R

D

A

1

A

• •

est un

oui

Où

Où

la
nature

a dit

non.

non.

non.

The palm grove:

It is a collection of gardens belonging to the inhabitants of the ksar, located outside the city walls. Each garden had its own isolated dwelling. During the hot season, the palm grove offers a welcome microclimate to the owners, who temporarily leave their city homes to devote more time to their crops, which require more watering at this time of year..



G

H

A

R

D

A

I

A

:

est un

oui

Où

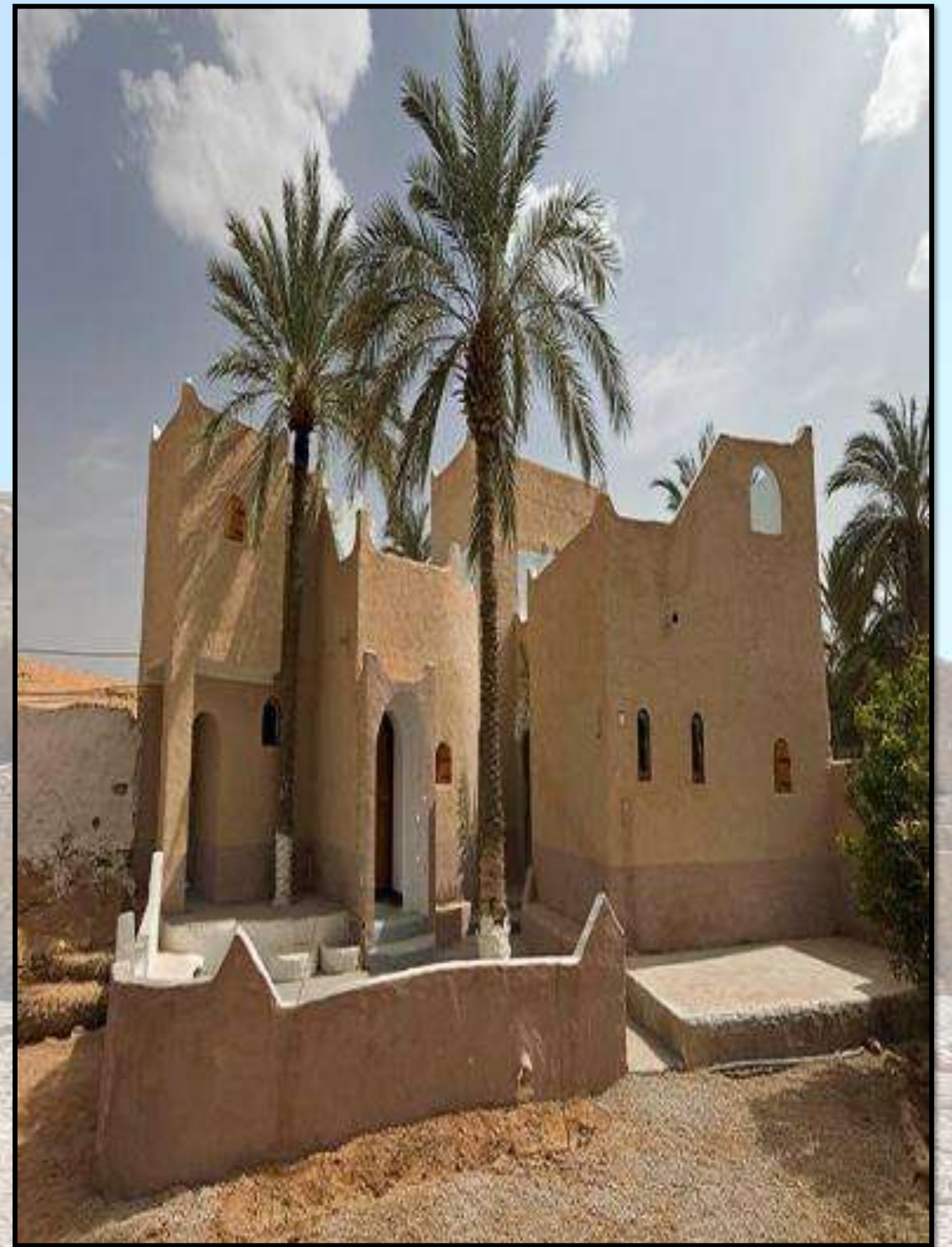
la
nature

a dit

non.

Les maisons :

Mozabite houses are heirs to the fundamental layouts of Maghreb and ancient houses, at least those of the western Mediterranean. The Mozabite dwelling, inheriting the Mediterranean model, was judiciously adapted, on the one hand, to the social conditions imposed by the Ibadite settlement in this region.



G

H

A

R

D

A

I

A

:

est un

oui

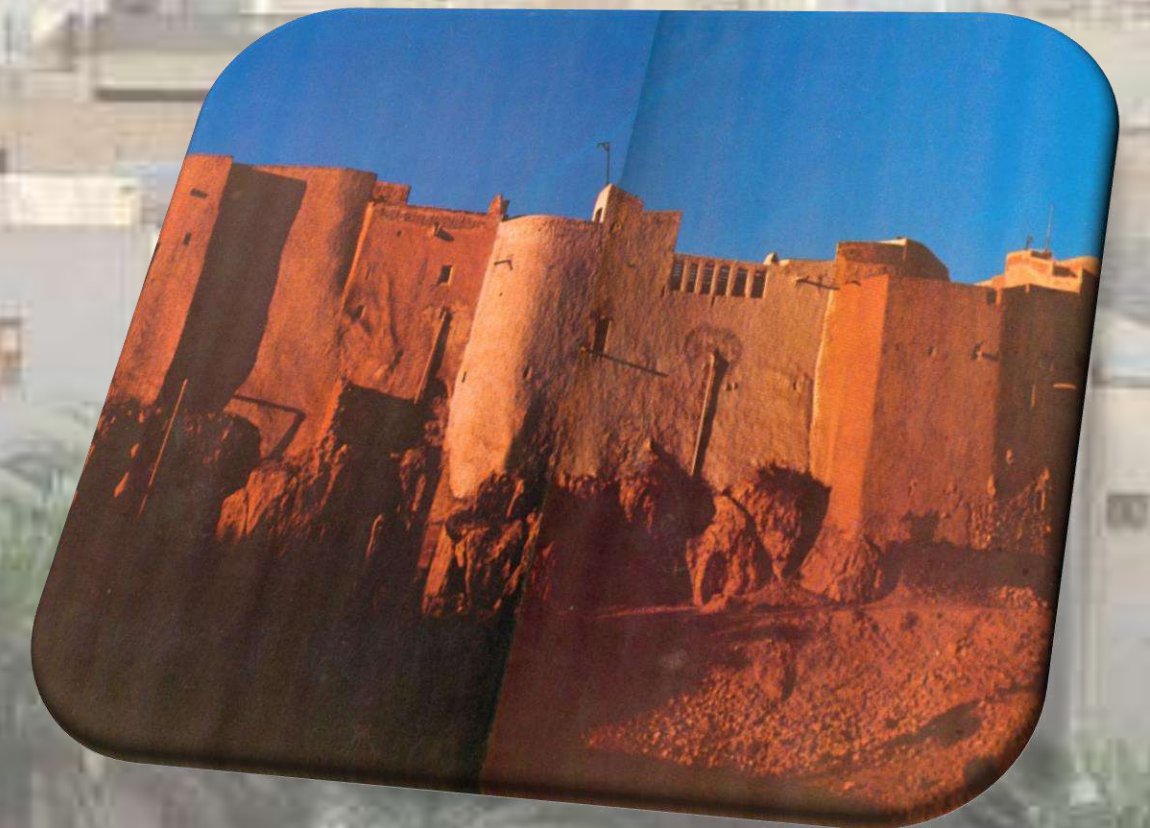
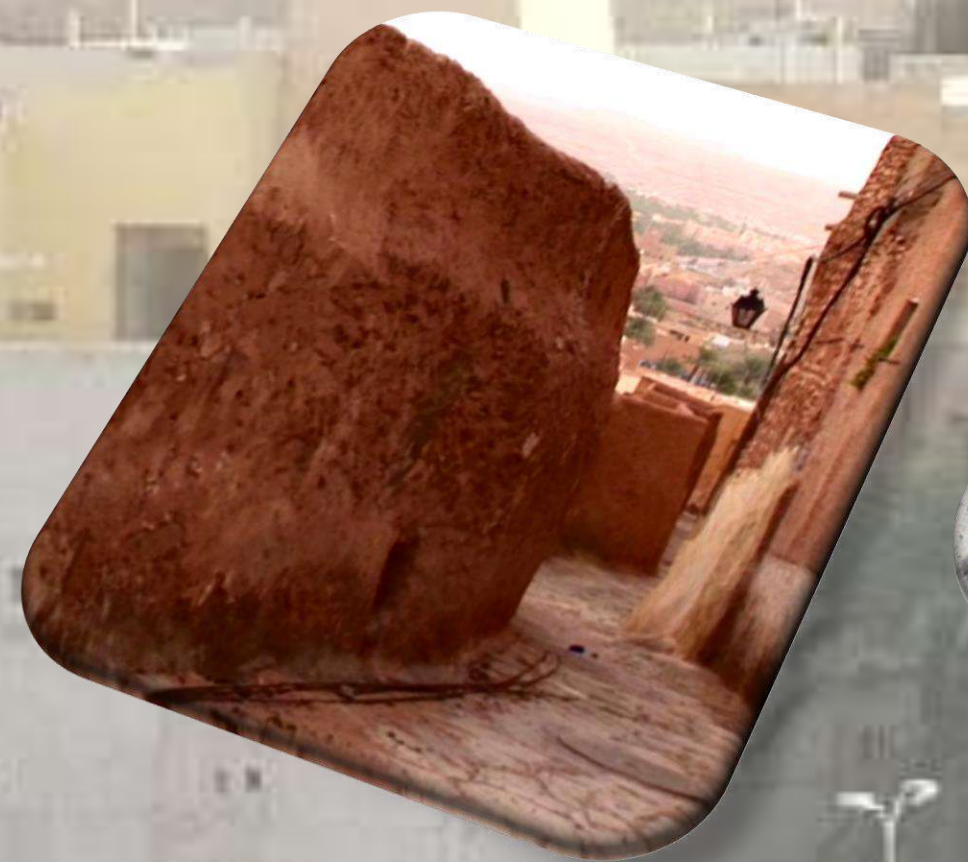
Où

la
nature

a dit

non.

The remparts :



G

H

A

R

D

A

I

A

:

est un

oui

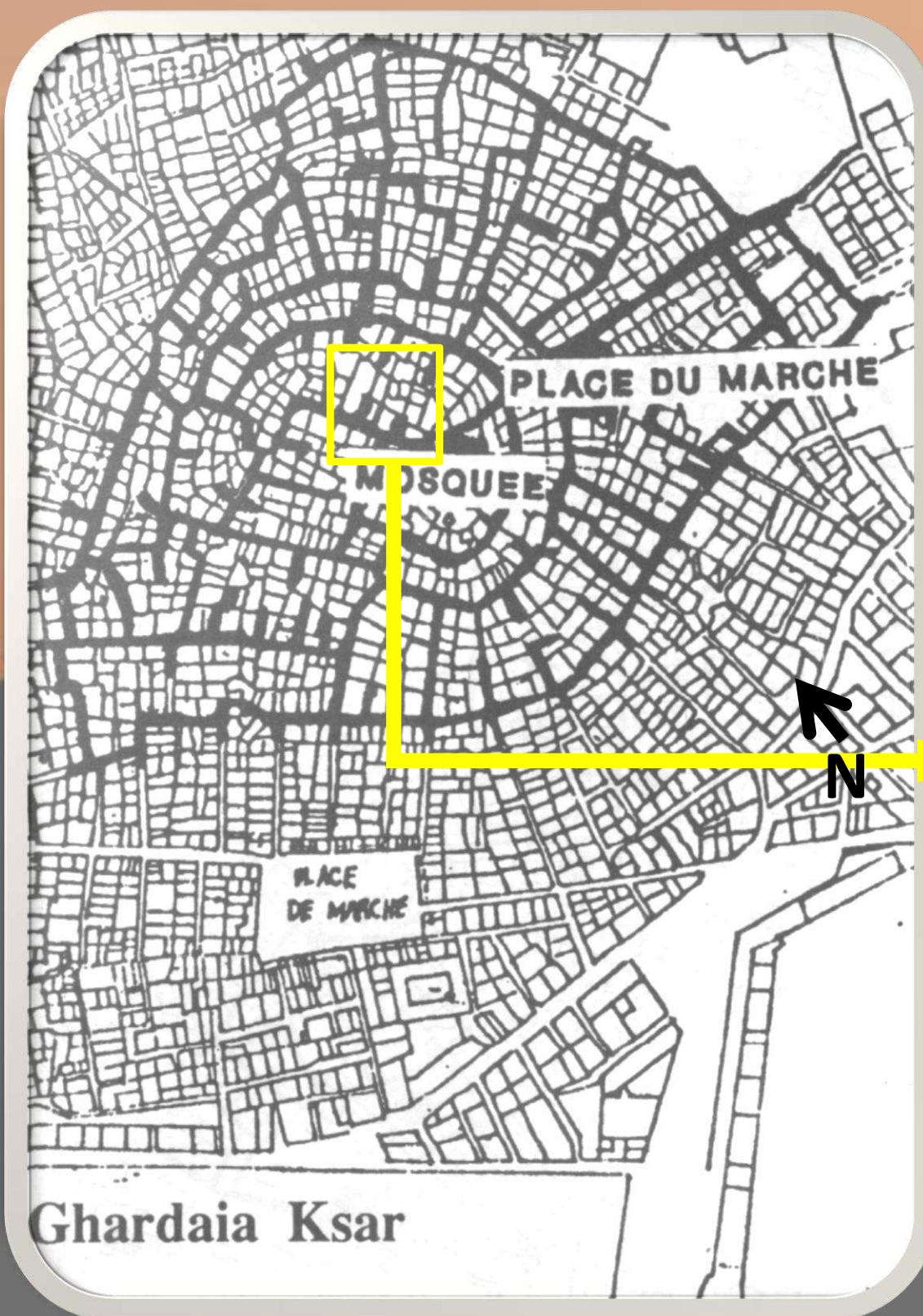
Où

la
nature

a dit

non.

The block of houses



The urban structure in the Sahara is generally dense. The housing units have a very rational surface area and volume.



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

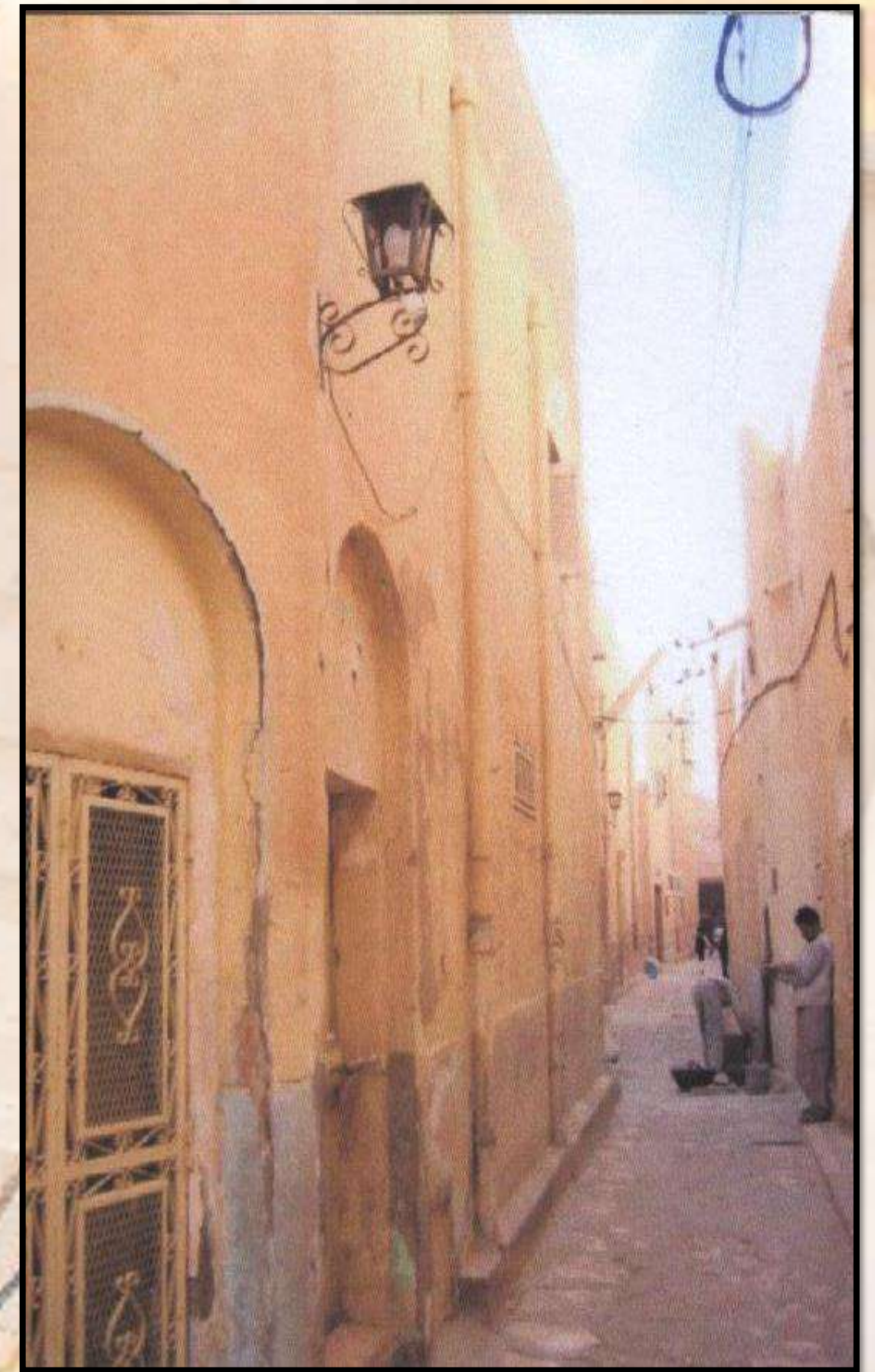
non.

Streets

There are two types of streets:

1- Commercial streets: located near the souk and off-limits to women.

2- Private streets: situated next to the houses around the mosque; outsiders never enter the city.



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

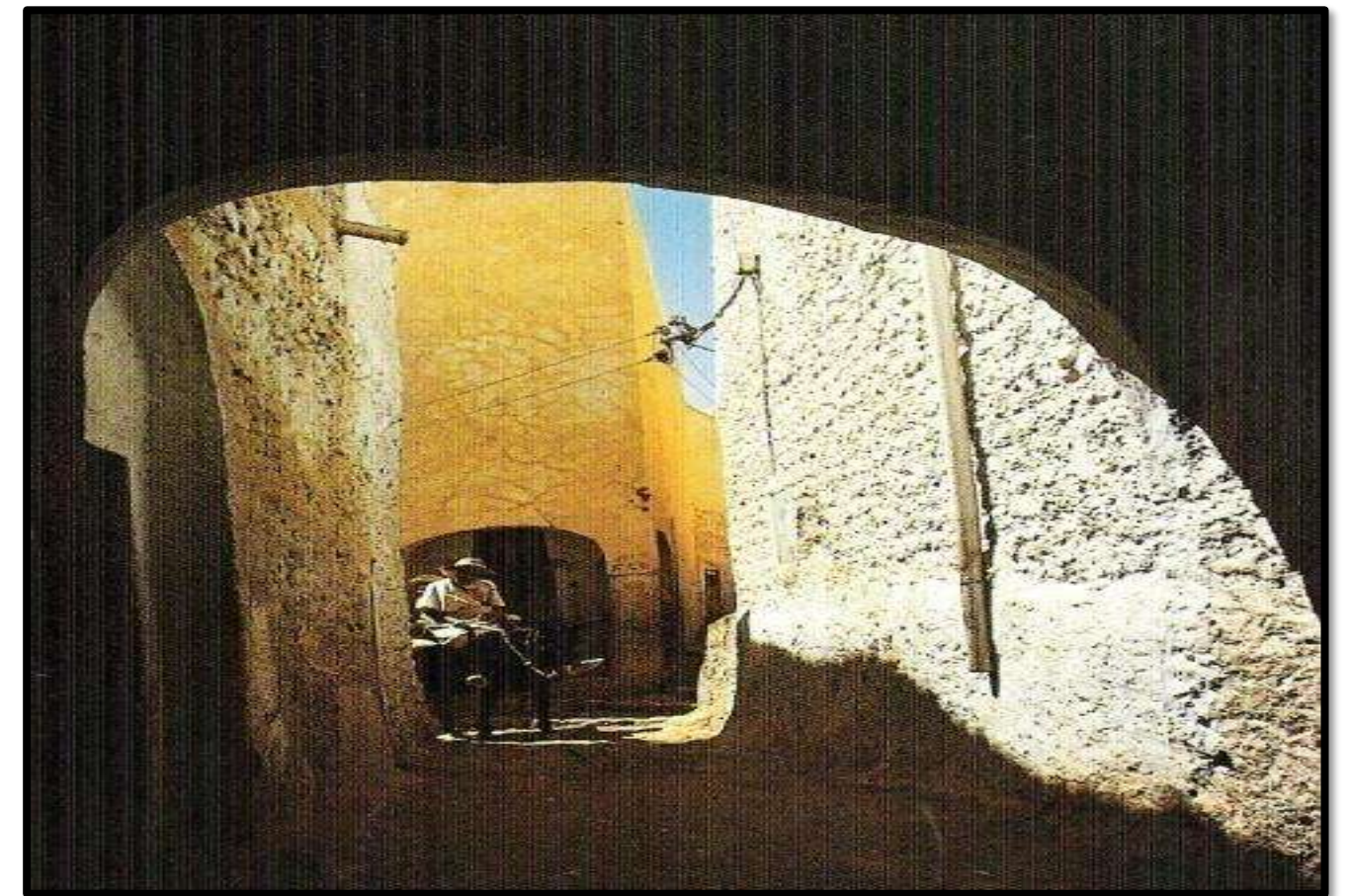
The alleyways

There are three types of alleyways:

1 – *Multifunctional*: These serve as market passages and meeting places thanks to the masonry benches built along the walls.

2 – *Bifunctional*: These serve as passageways and access points to houses

3 – *Unifunctional*: These are dead ends, providing access only to one's home. Traditional southern towns are characterized by very narrow alleyways, sometimes entirely covered to facilitate the movement of shadows between neighborhoods. The alleyways between houses are climatically adapted to the local climate.



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

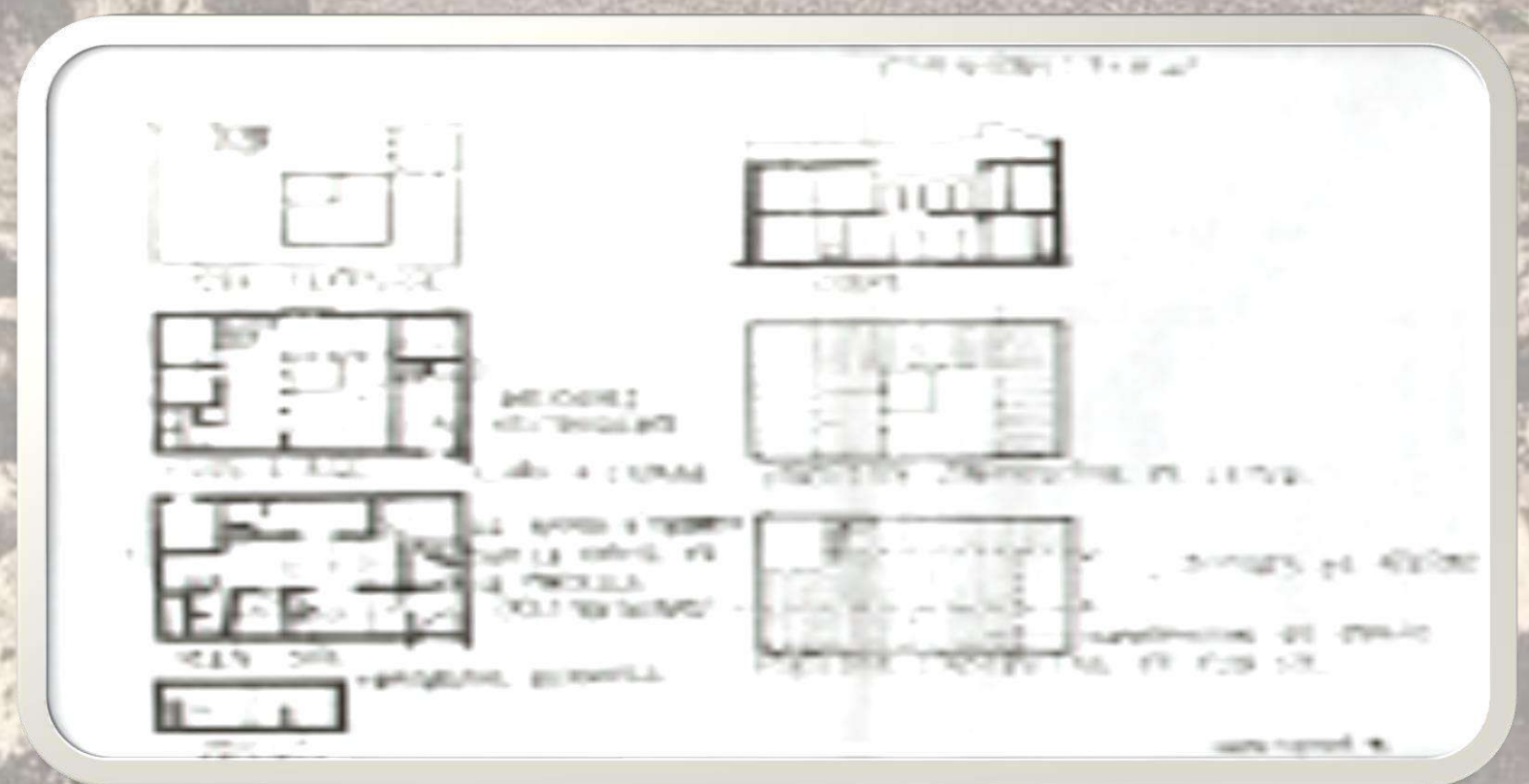
non.

Type OF HOUSES

The irregular shapes of the layouts are more in line with this order of things, because the same phenomenon was observed in places where the site offered fairly regular platforms; **the interior of the houses, moreover,** expresses a fairly high degree of regularity which is due to the nature of the framework, an orthogonality which the irregularity of the shape of the container dominates and erases.

☆ rectangular houses

The rectangular shape is most often found in strip association plot groups.



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

Terraces

In the Saharan regions, terraced roofs are widespread, but none are so meticulously designed for constant use. In the M'zab Valley, every constructed shelter is equipped with and complemented by its own accessible, habitable terrace, whether it be a mosque or a house. The city streets, lined with high, sparsely pierced walls, extended further by often blind parapets, convey a certain severity. This is offset by openness, light, and a sense of imagination. The Maghreb patio, called the "center of the house," is known in the M'zab Valley as the "upper center." In the M'zab Valley, arcades never extend more than two or three sides. One side always remains unbuilt, allowing ample sunlight.



G

H

A

R

D

A

I

A

:

est un

oui

Où

la nature

a dit

non.

❖ *Au M'Zab, on trouve deux types de maisons :*



❖ *Celle qui est intégrée au tissu urbain des villes de la pentapole*



❖ *Et celle de leurs palmeraies ou la maison d'été*



L'usage de ces maisons:

❖ l'autre est lié aux saisons:

car en hiver, soirées et nuits se dérouleront au RDC qui est le mieux protégé des rigueurs du froid, mais le début de la journée se déroulera sur la terrasse ou sous l'Ikoumar.

En été les terrasses deviendront inconfortables la journée et pour les utiliser il faudra attendre le soir, alors que amesentidar qui a accumulé la chaleur de la journée dans ses murs devient insupportable la nuit. Le RDC rafraichi toute la nuit accueillera les activités de la journée.



I

A

:

est un

oui

Où

la
nature

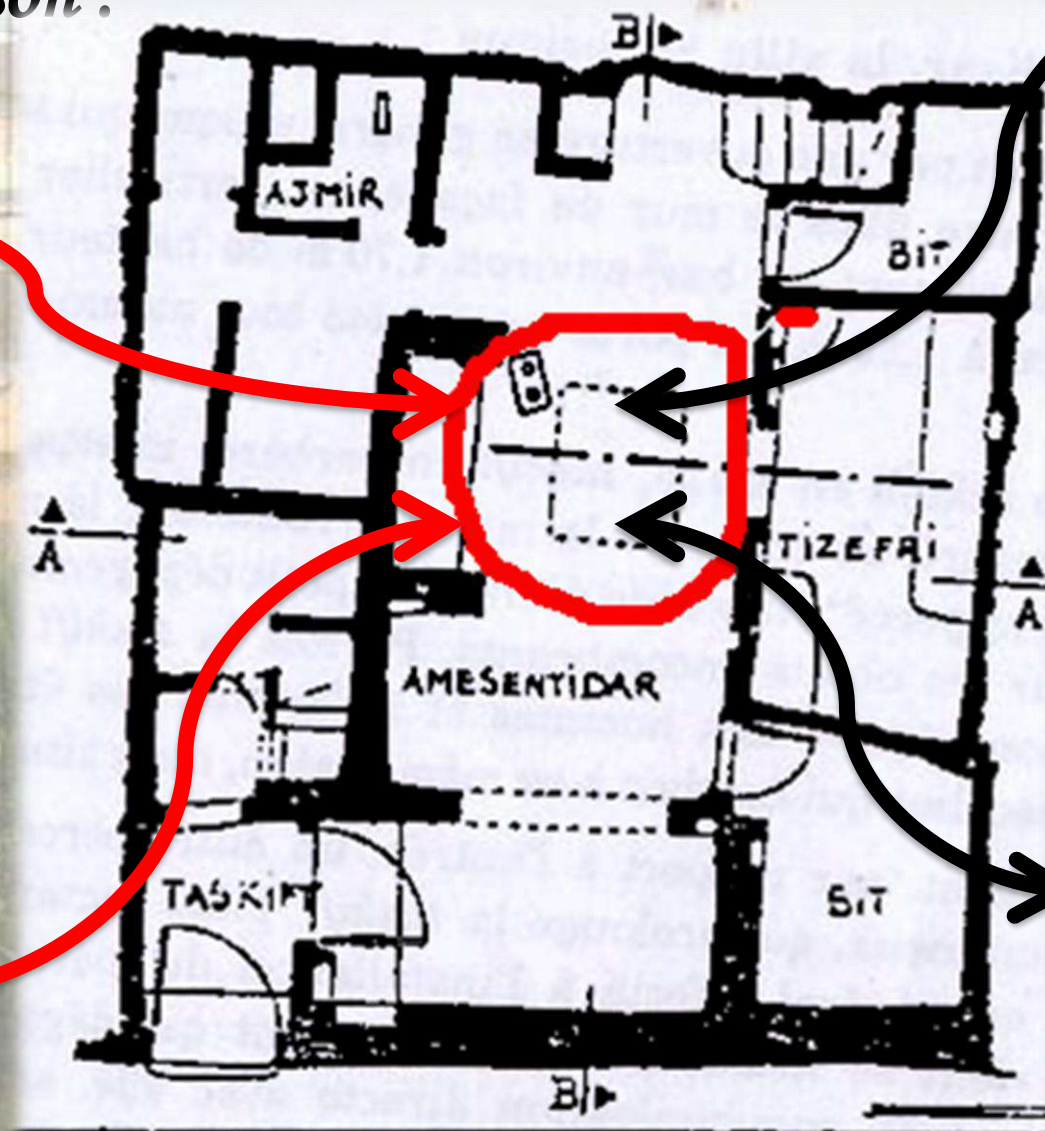
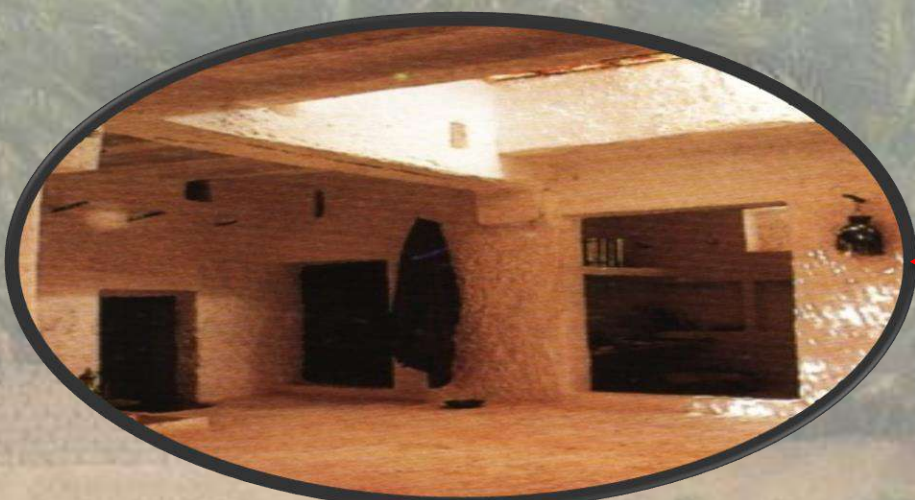
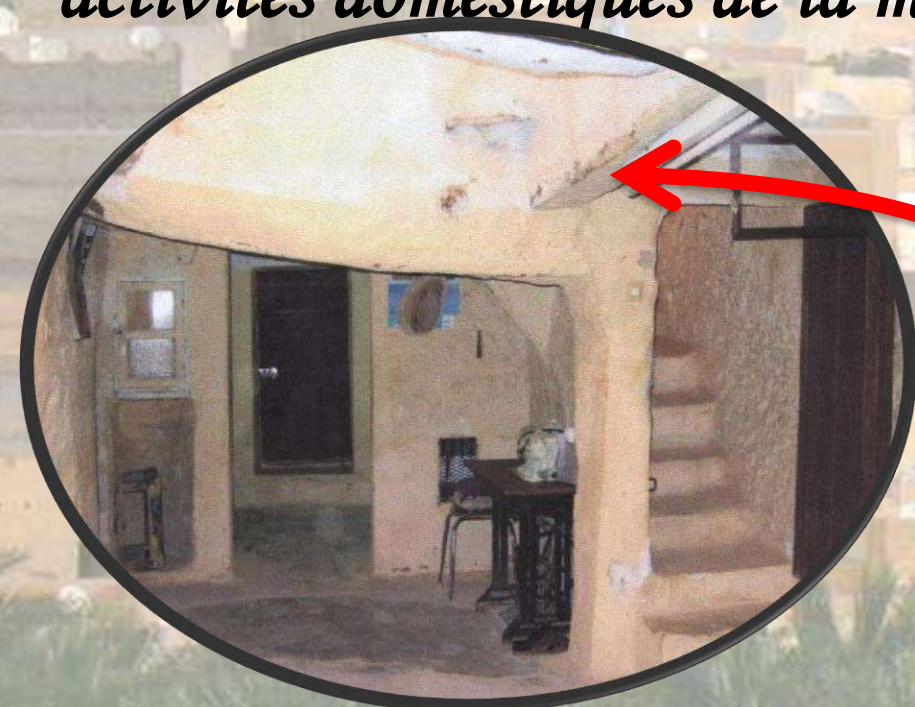
a dit

non.

❖ Amsentider (West Eddar) :

❖ C'est l'espace principal de la maison, représenté par un patio carré, entouré de petites chambres longues et étroites, servant aux travaux féminins .

❖ C'est aussi l'espace où se déroule l'ensemble des activités domestiques de la maison .



❖ Chebek :

❖ Une ouverture pratiquée dans le plafond , carrée de 2 mètres de côté environ et souvent couverte d'une grille, permet à l'air et au jour de pénétrer , et à la fumée des kanouns de s'échapper, sa position est souvent centrale .

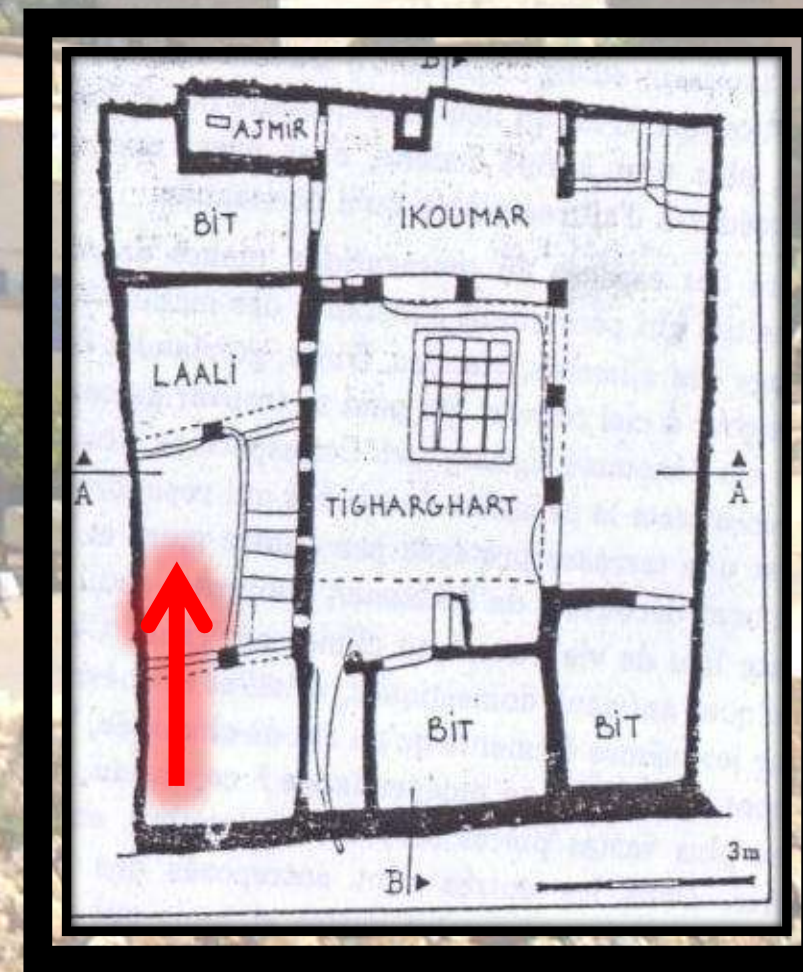
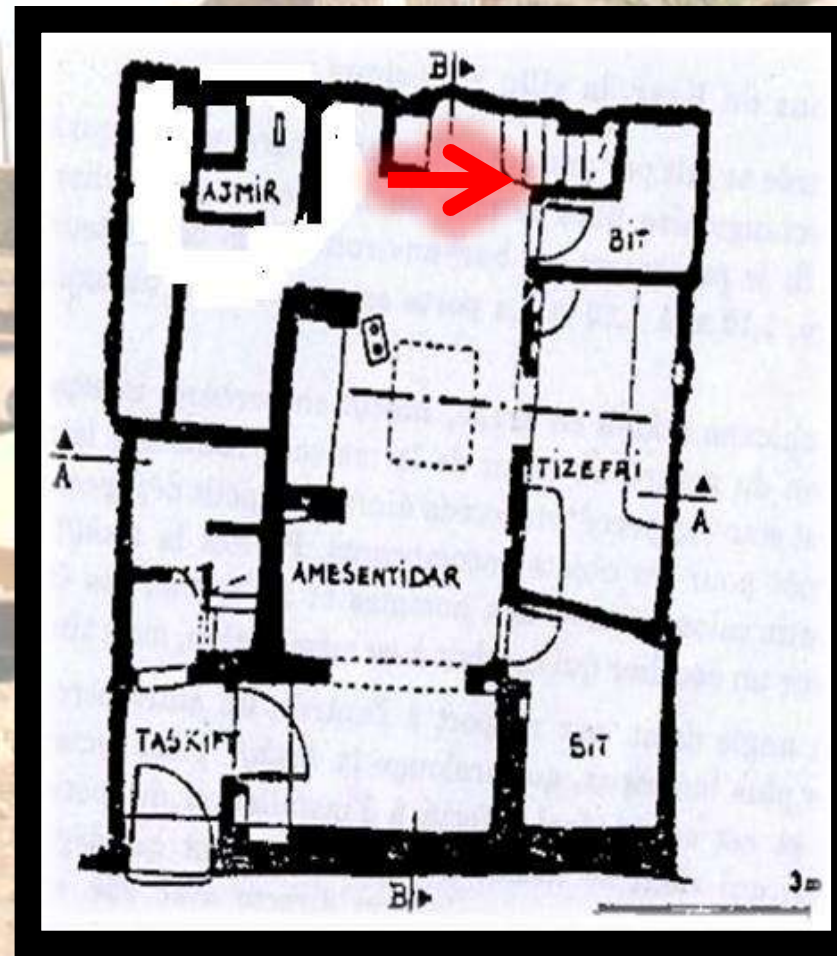


❖ The staircase:

❖ *Located in a corner, the flights are short, the steps are 20 to 25 cm high, it has 8 to 10 steps and we often notice 2 staircases:*

❖ *One feminine and family-oriented*

❖ *The other is in direct communication with the taskift, offering access to the upper floor and avoiding the view of West Edf*



I

A

:

est un

oui

Où

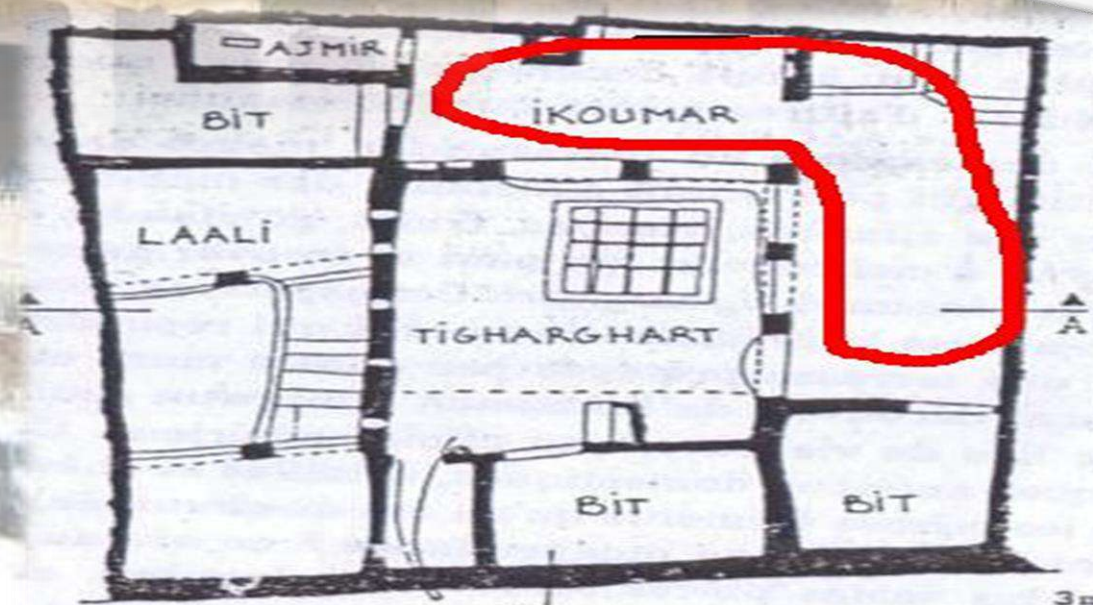
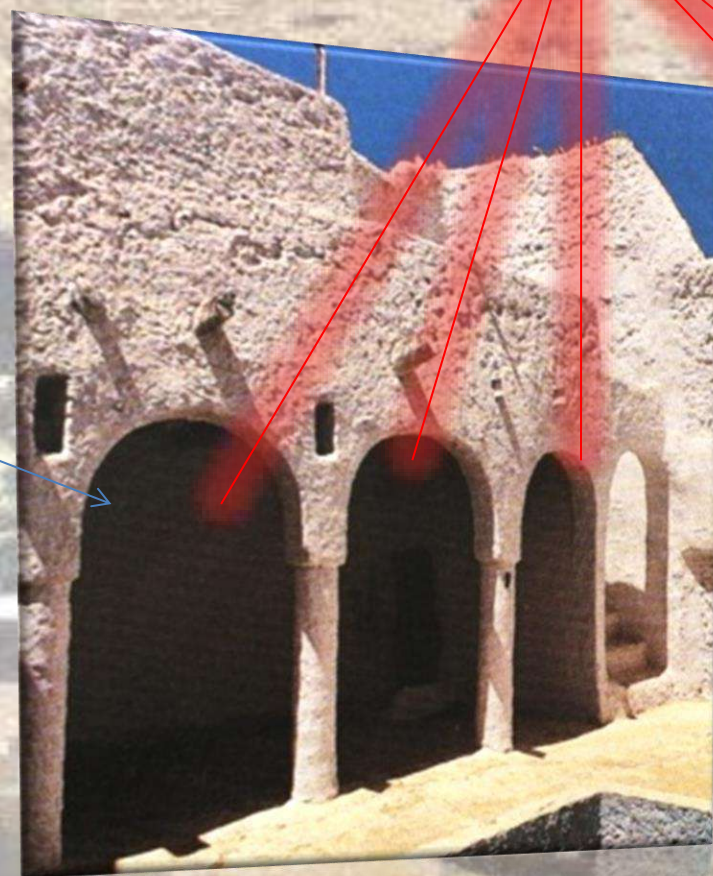
la
nature

a dit

non.

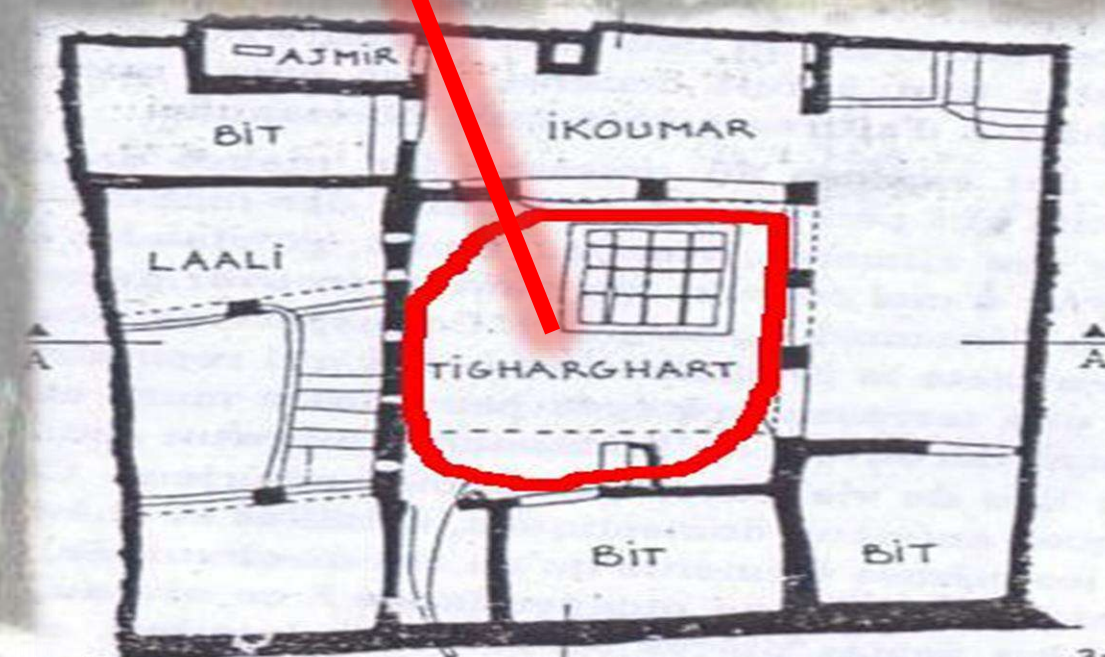
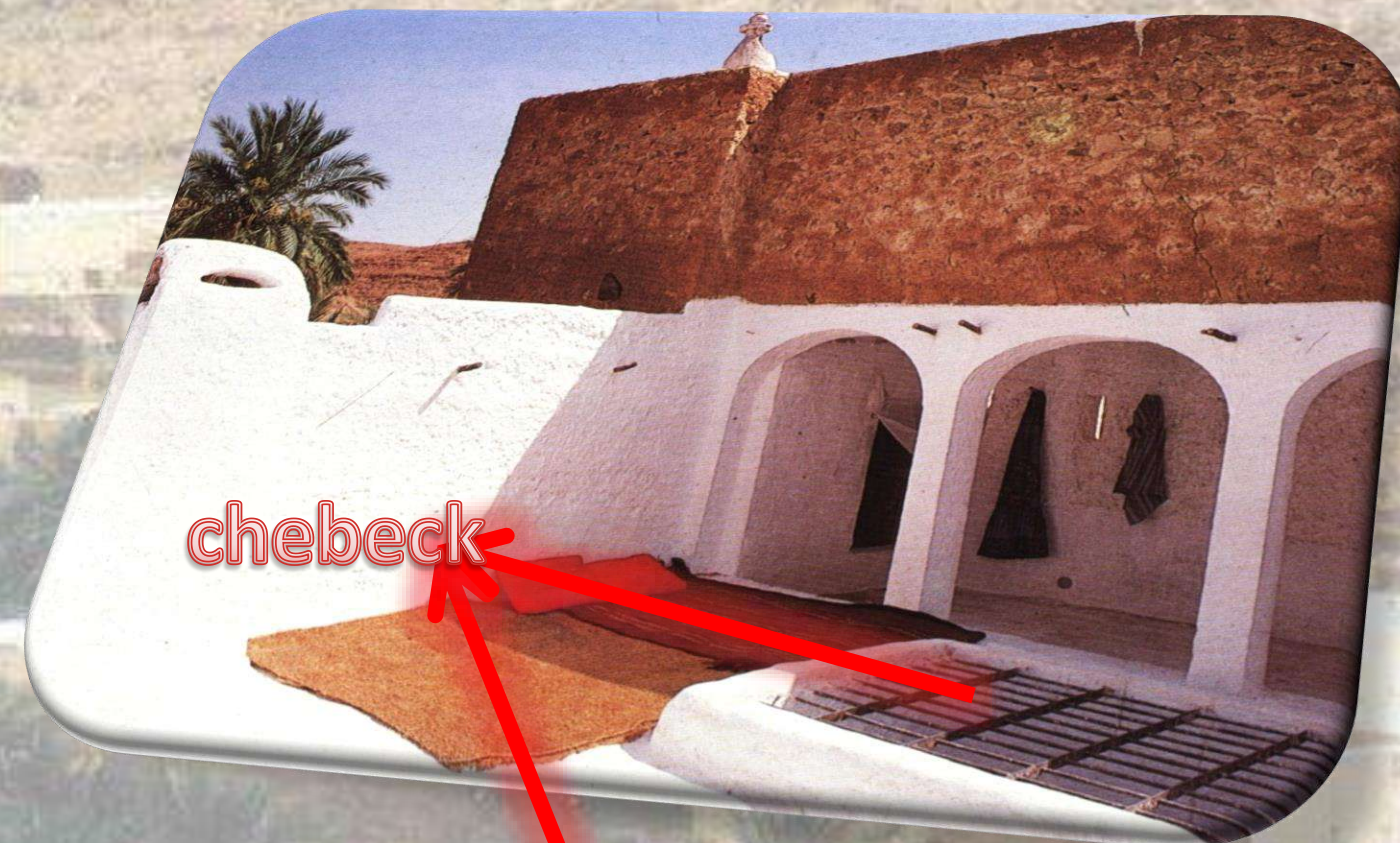
❖ Ikoumar :

❖ Espace intermédiaire (ni dehors, ni dedans), il s'ouvre à travers 2 ou 3 arcs sur l'espace central, à ciel ouvert.



❖ tigherghart :

❖ Cour à ciel ouvert qui se situe au dessus de west eddar, c'est par elle à travers le chebeck le RDC est éclairé.



I

A

:

est un

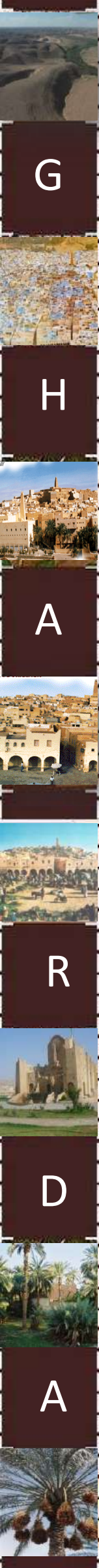
oui

Où

la
nature

a dit

non.



G

H

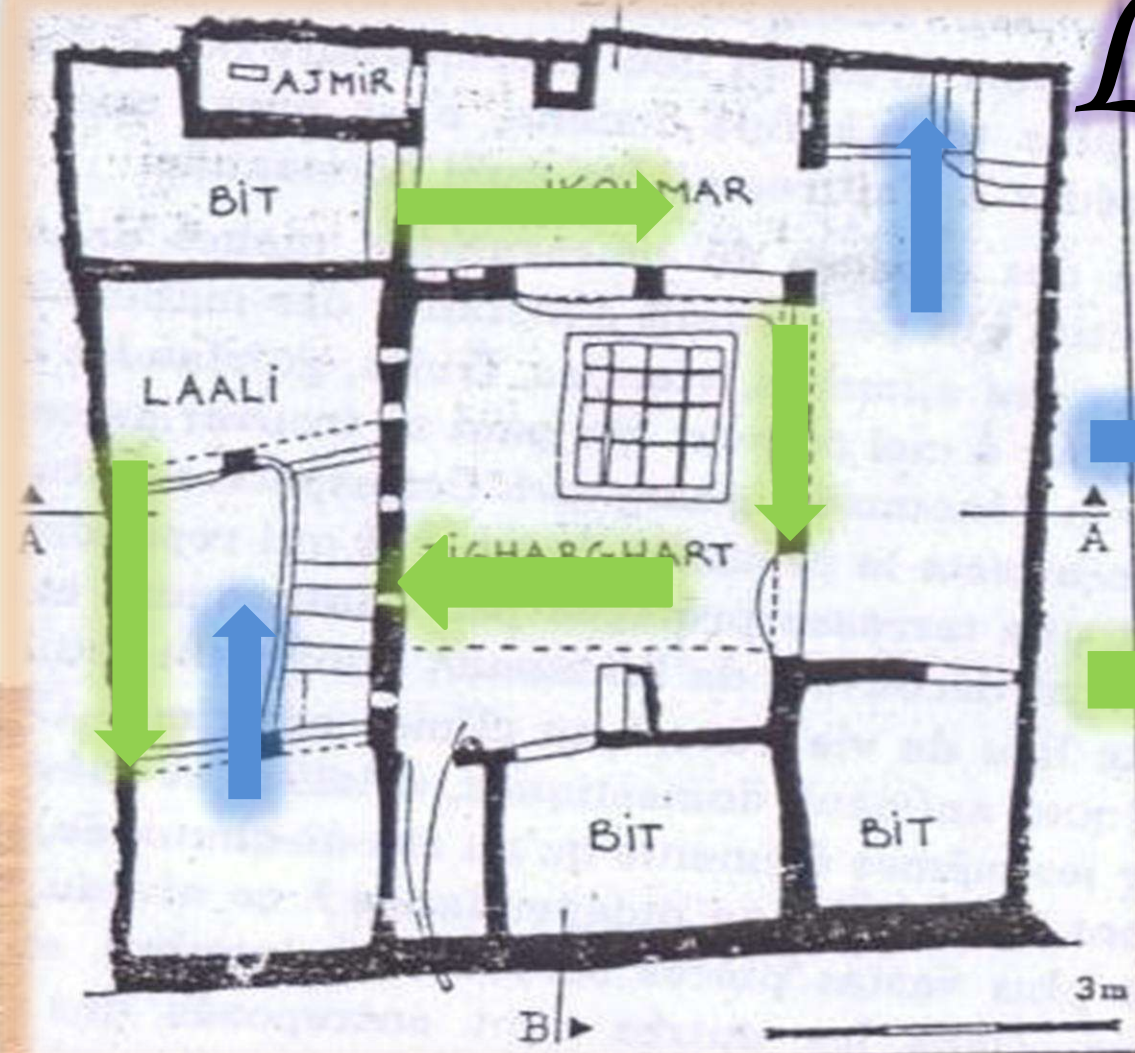
A

R

D

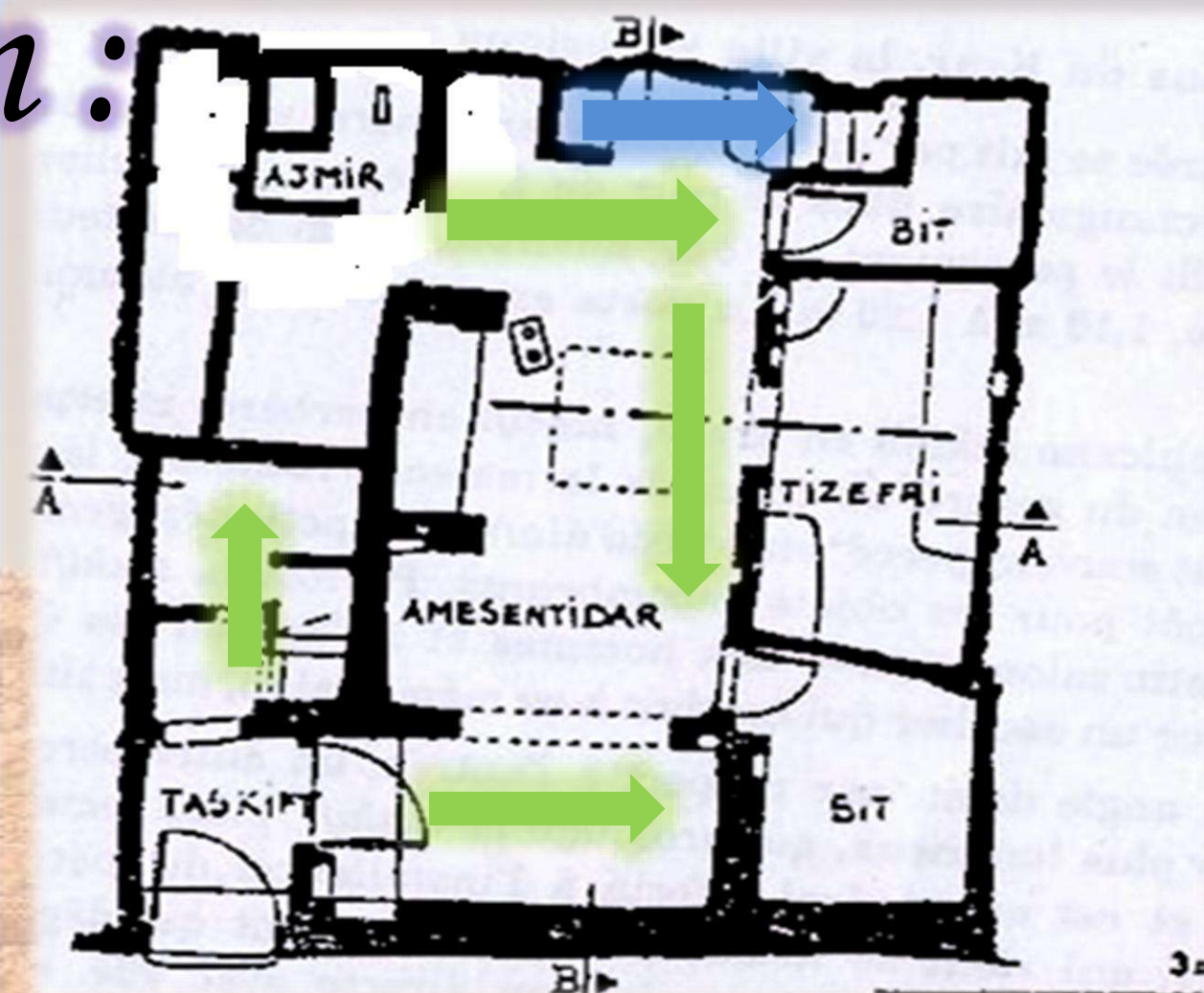
A

La circulation :

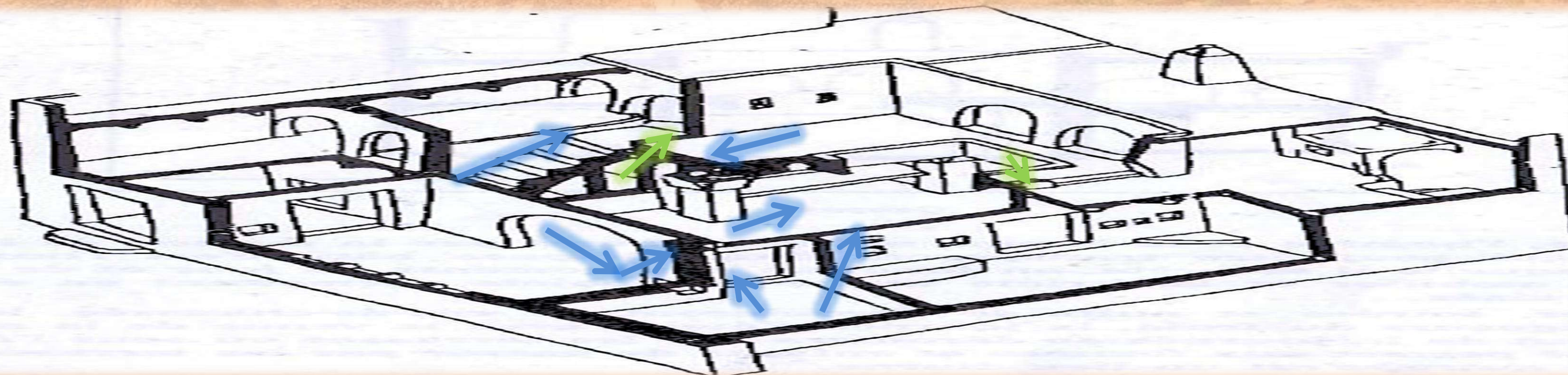


vertical circulation

Horizontal circulation



❖ Au premier étage, on trouve, la même organisation qu'au RDC, de petites pièces organisées autour d'un espace central.



I

A

:

est un

oui

Où

la
nature

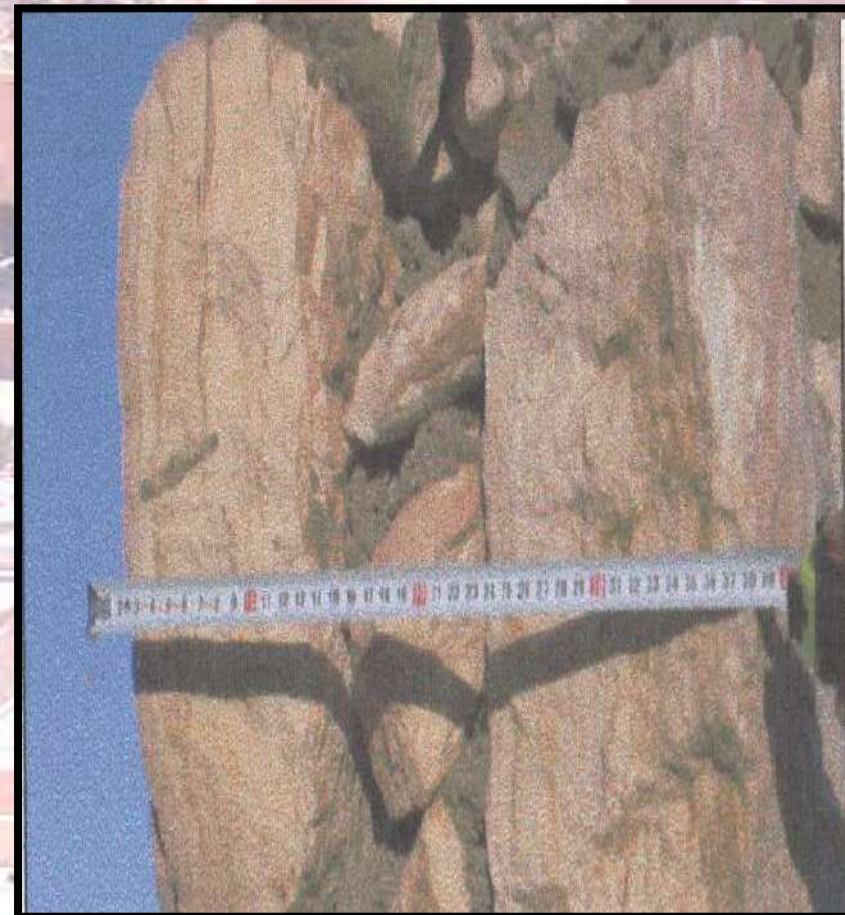
a dit

non.

1. *Les matériaux :*

a) The stone

: *Blocks of varying sizes are extracted from the regular strata of white limestone. Flat stones are reserved for horizontal arrangements.*



b) The raw brick (or earth brick):
About the size of a concrete block, it is made from the most clayey soils (Le Toub). The wet earth is kneaded and molded, then dried in the sun.



G

H

A

R

D

A

I

A

:

est un

oui

Où

la
nature

a dit

non.

g) La chaux : la chaux est utilisée comme liant dans la construction (pierres ou briques de terre), comme enduit et comme peinture. La chaux est obtenue à partir de carbonates extraits de la Chebka du M'Zab .

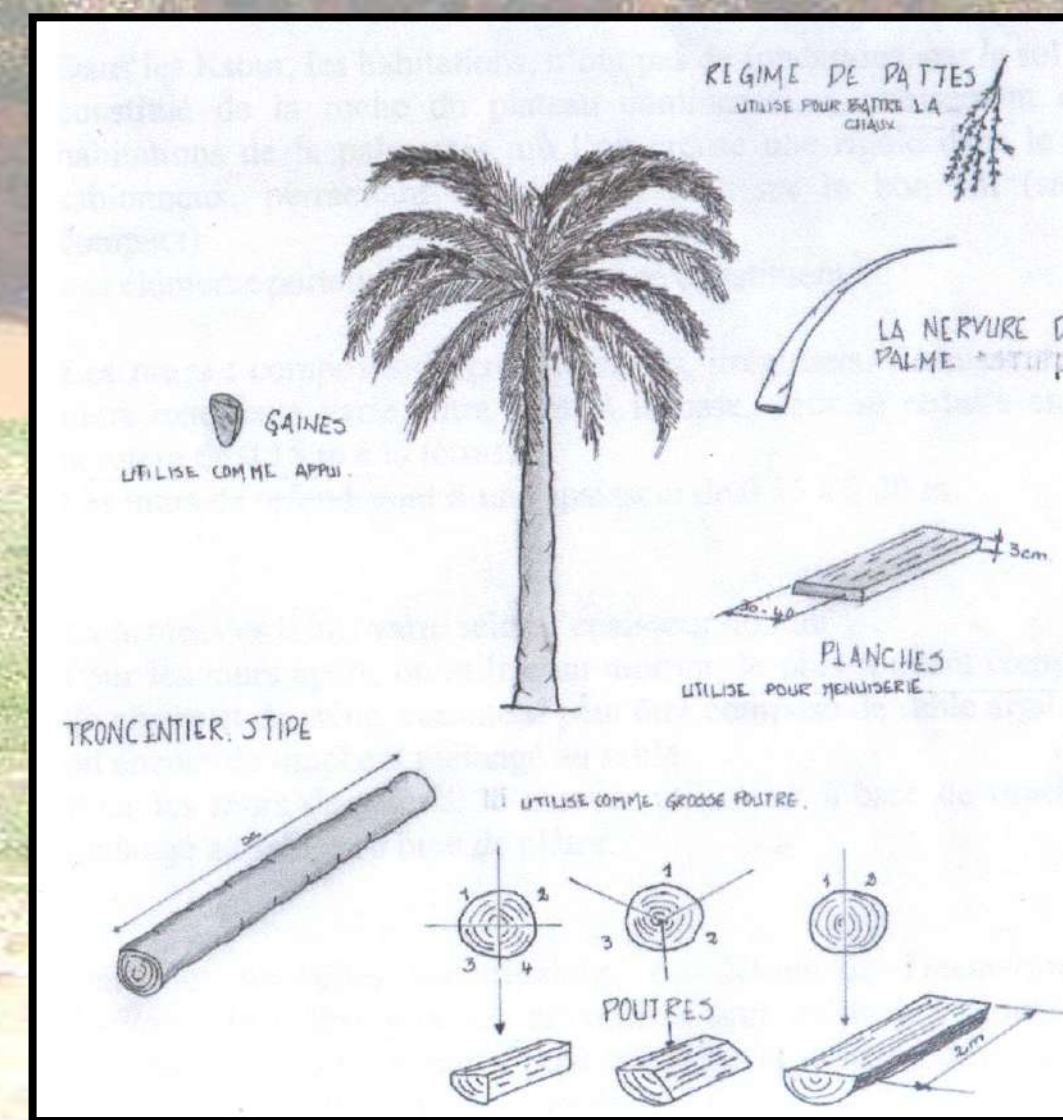


h) Le palmier : Cet arbre est entièrement utilisable mais il n'est mis en œuvre qu'après sa mort afin de ne pas détruire le palmier étant la recharge principale de la vallée .La construction emploie le stipe (ou tronc), la palme et la gaine qui est la base de la nervure de la palme .

1) Le stipe : Il est utilisé entier pour réaliser de grosses poutres. Il peut être scié, dans le sens de la longueur, en 2,3 ou 4 parties qui donneront des poutres présentant une face plane de 20 à 30 centimètres de côté sur 2 à 5m de long (pour les plafonds).

2) La palme : (Touffa) Elle est d'abord séchée pour être utilisée entière ou dépouillée et réduite à la nervure .

3) la gaine : (Tahjourt) De forme triangulaire et relativement résistante est le plus souvent utilisée comme appui et dans le remplissage des dalles.



I

A

:

est un

oui

Où

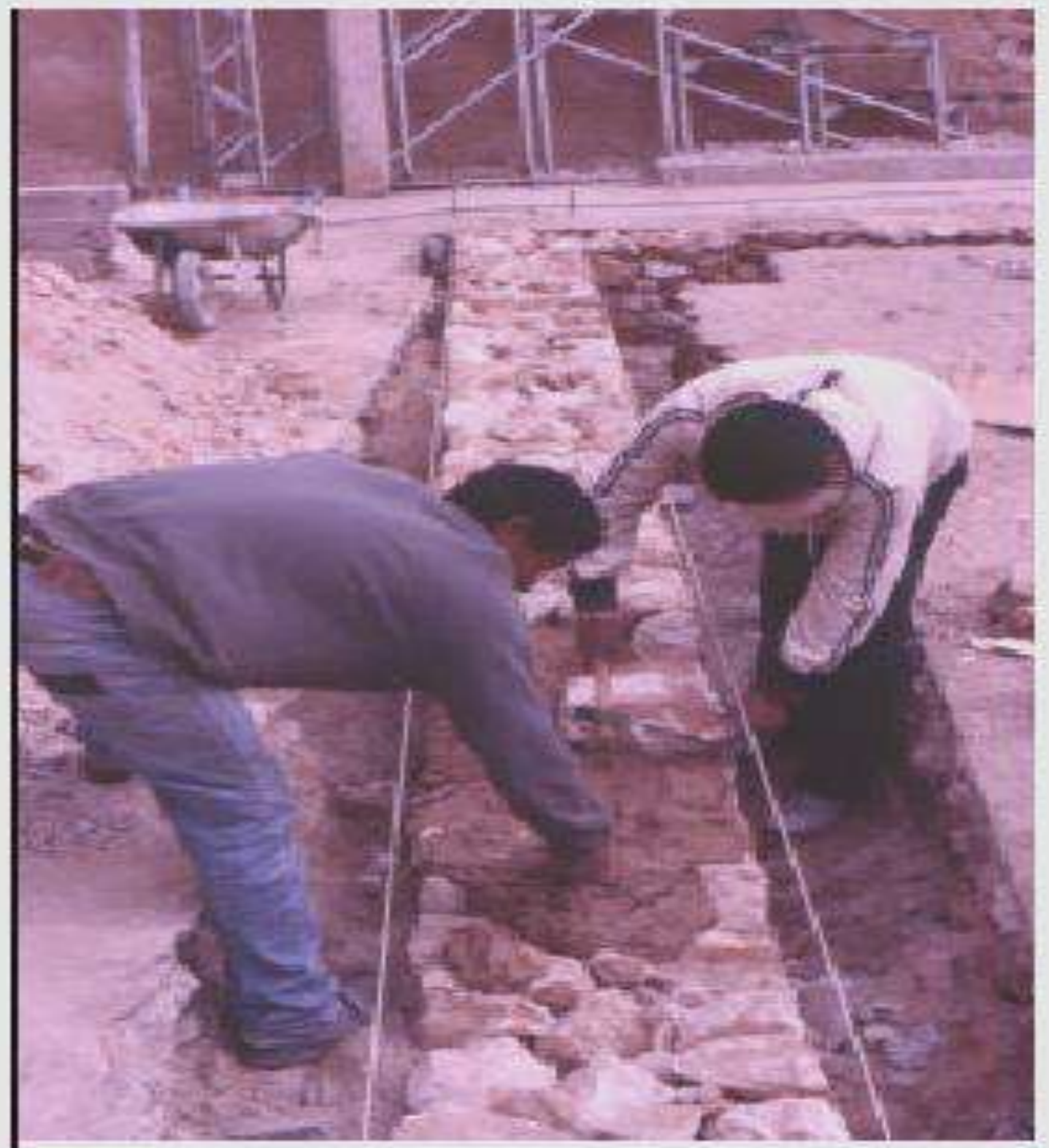
la
nature

a dit

non.

TECHNICS OF CONSTRUCTION

Illustrations



Fondations



G

H

A

R

D

A

I

A

:

est un

oui

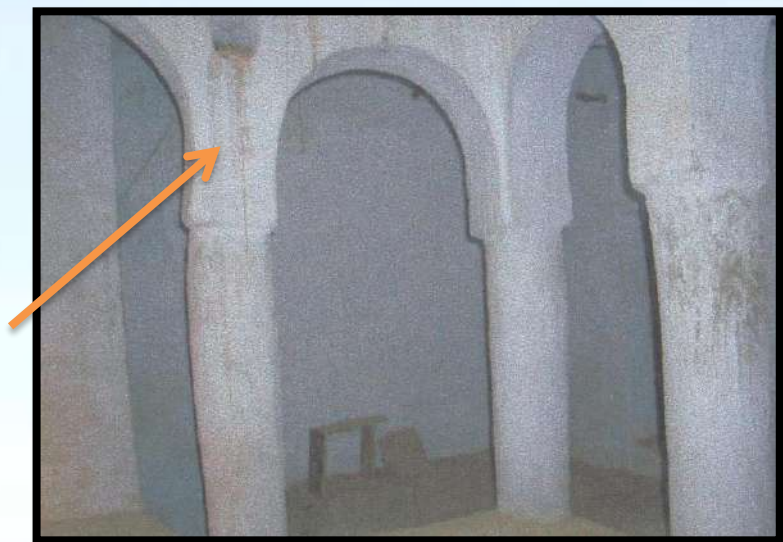
Où

la nature

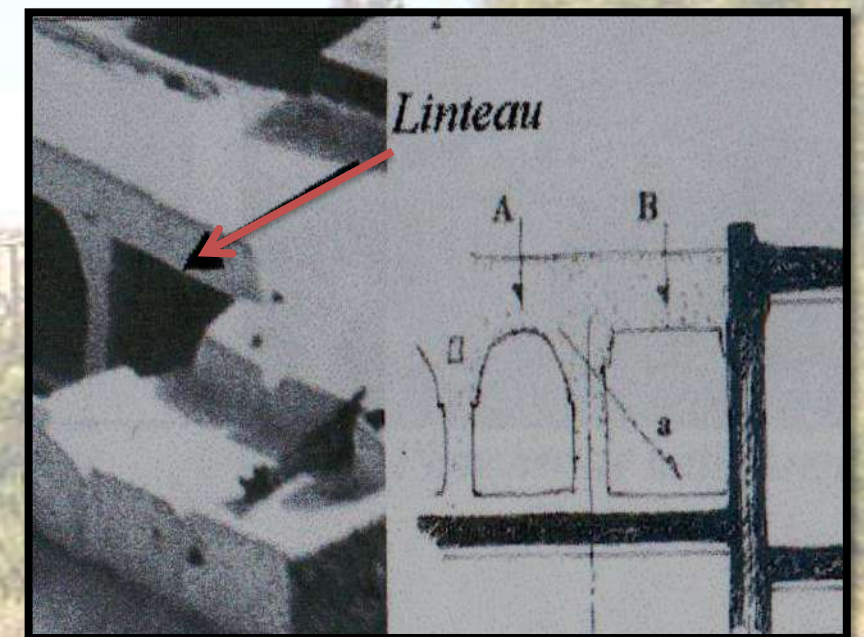
a dit

non.

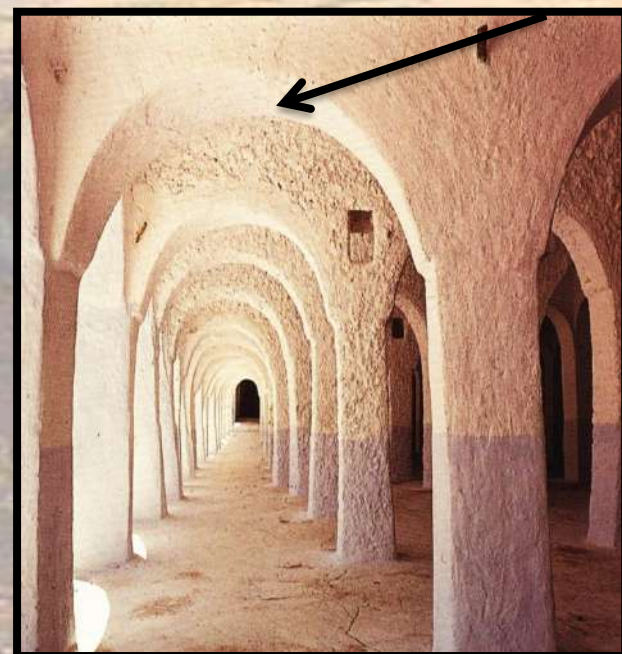
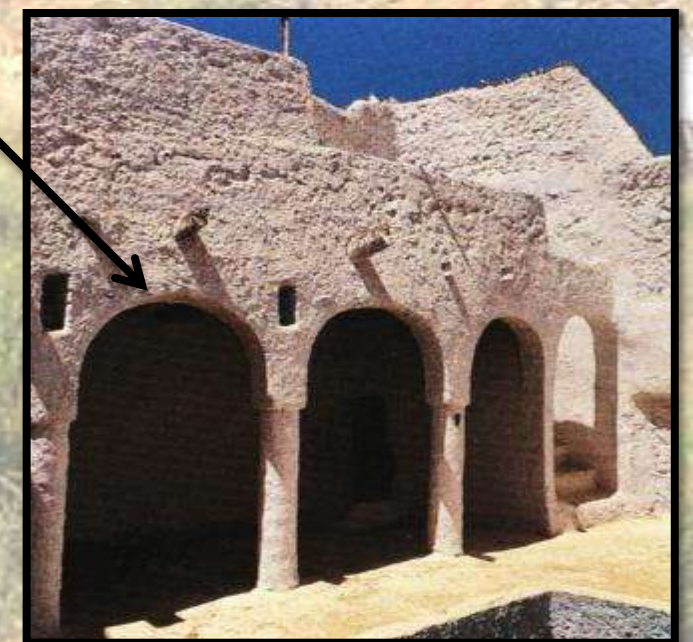
2. THE PILLARS : The pillars are made of rubble stones sometimes bonded with clayey sand, but more frequently with Timchent mortar and sand, or with plaster alone (quick setting). Their dimensions vary greatly, from 20cm to 1m on each side.



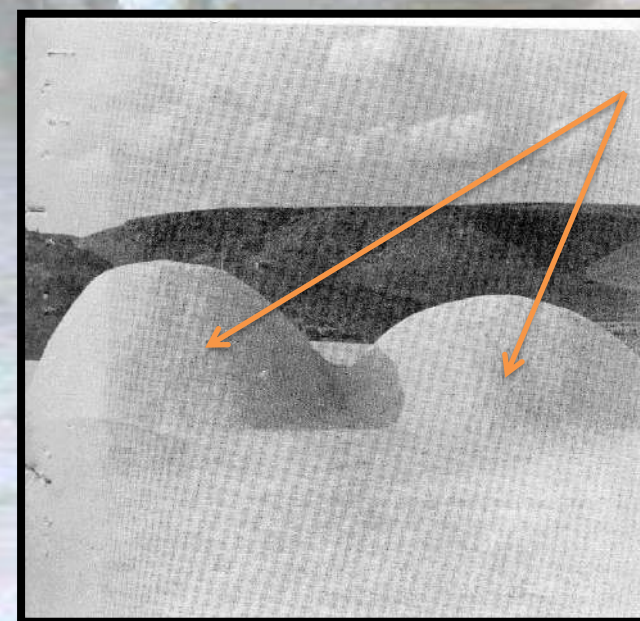
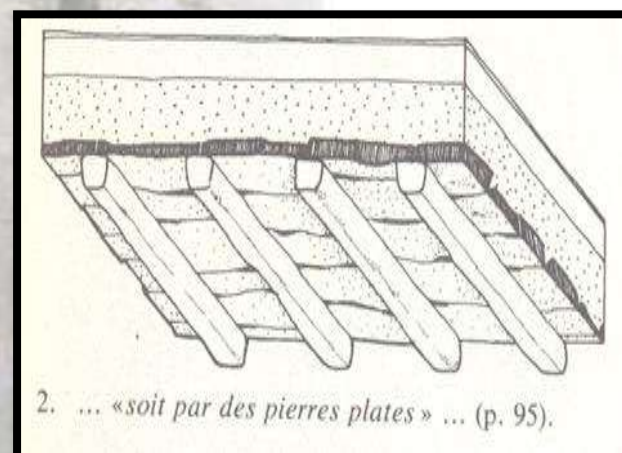
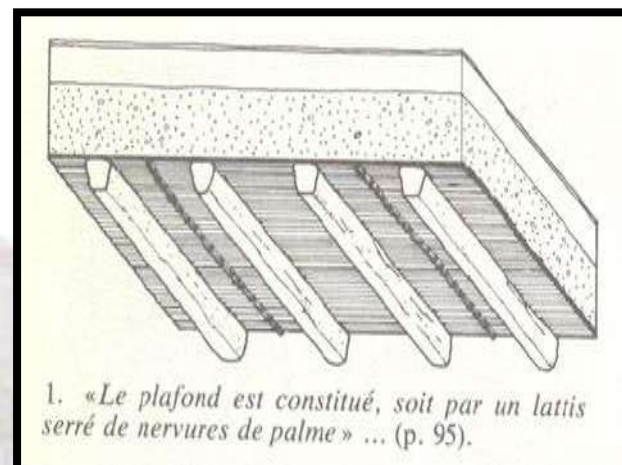
3. Beams and lintels:: Large pieces of wood, cut from the trunk of the palm tree, are used. Their ends are embedded in the Timchent. These beams, which support walls and often part of the floor's infrastructure, are placed with the heartwood underneath.



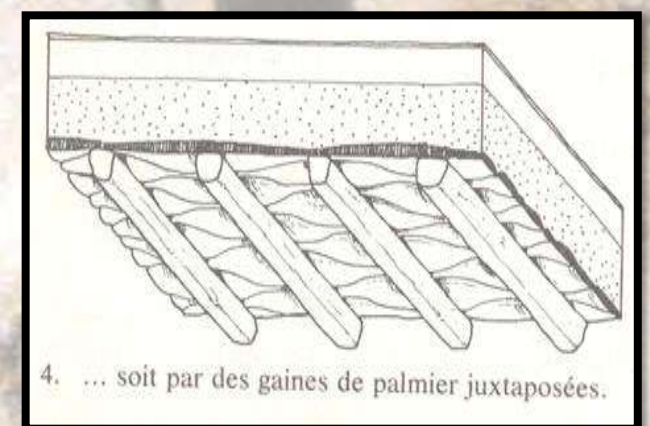
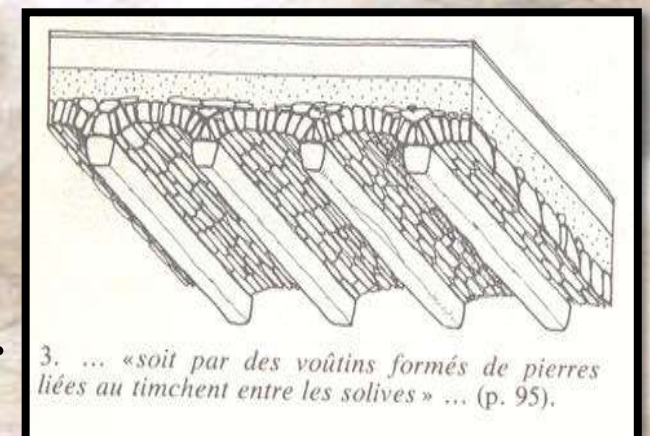
4. Bows: They are made of rubble laid in successive "courses", facing each other, using two techniques: the arch can be defined by a few props during the time of the setting of the Timchent or by means of a lost formwork.



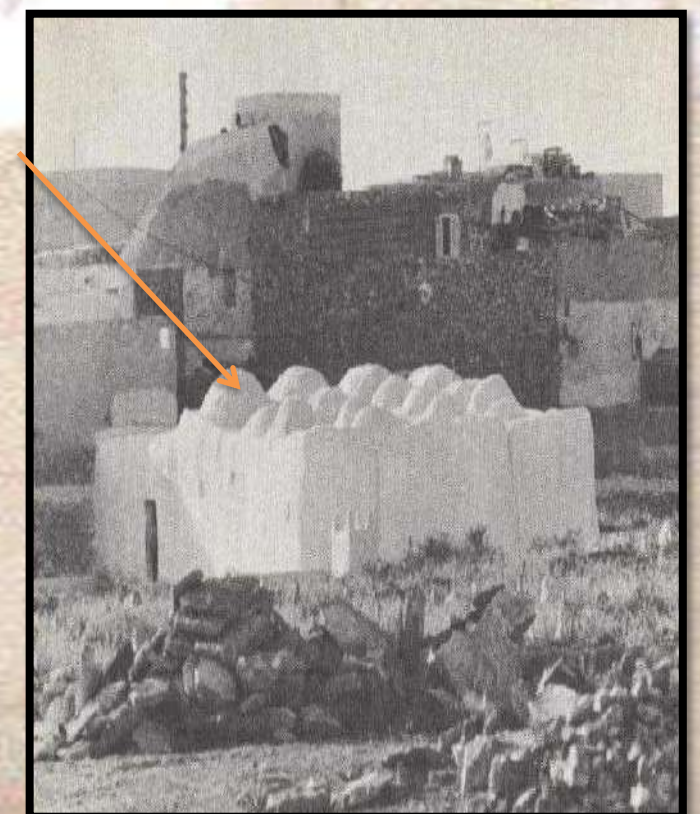
c) Cover elements:



1) The Floors: The floor joists are made of palm trunks sawn lengthwise. These joists are spaced approximately 30cm apart. Occasionally, logs or trunks from other trees are used, but the technique remains the same.



2) The domes: They are mainly used in buildings found in cemeteries. They are supported by pillars or walls via pendentives. They are made of rubble and Timchent stone; some are constructed with a cross-bracing of palm ribs that rests on the pillars.



I

A

:

est un

oui

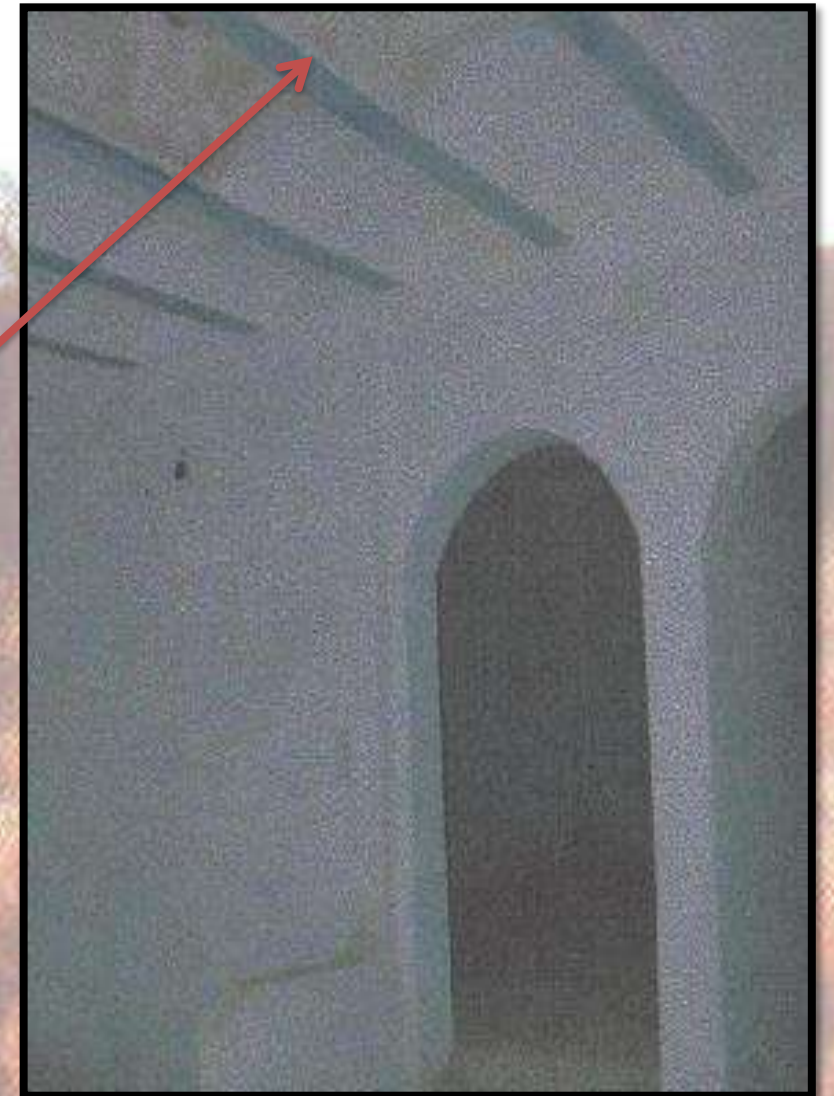
Où

la
nature

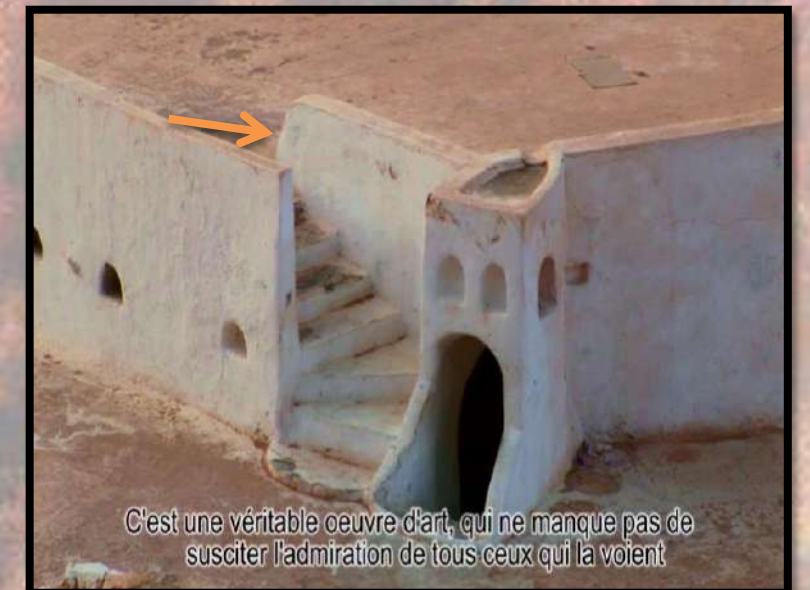
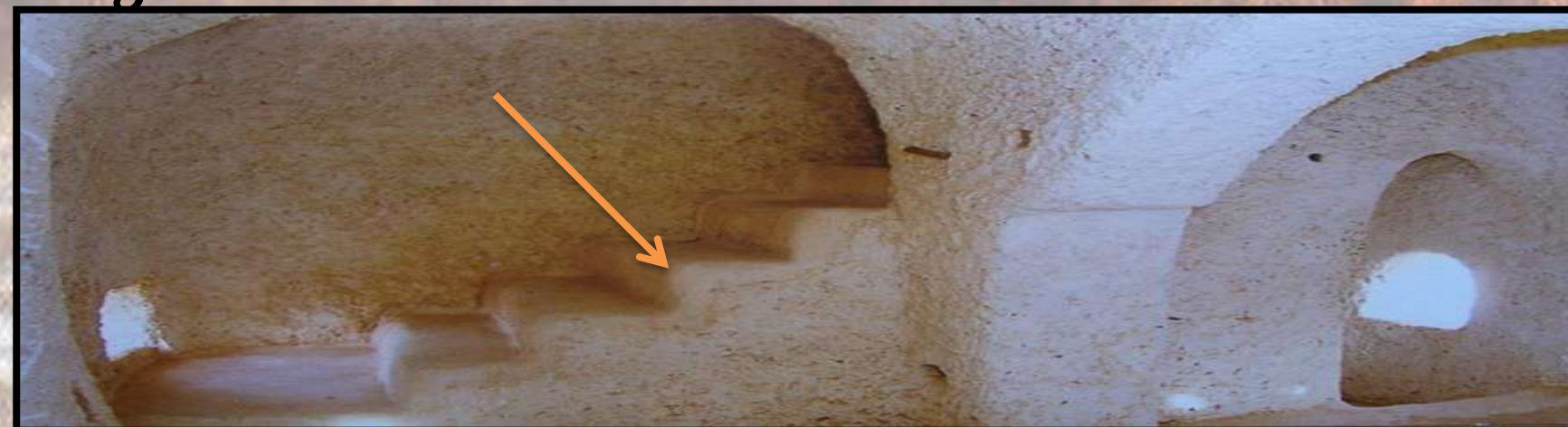
a dit

non.

3) The vaults: *The construction of the vaults uses the same technique as that of the arches: stones set in the Timchent mortar on a lost formwork of palm ribs. These are vaults of short span, often less than one meter. If they are reinforced by transverse arches, this limit can be slightly exceeded. The barrel vaults are generally somewhat flattened, in the shape of a basket handle.*



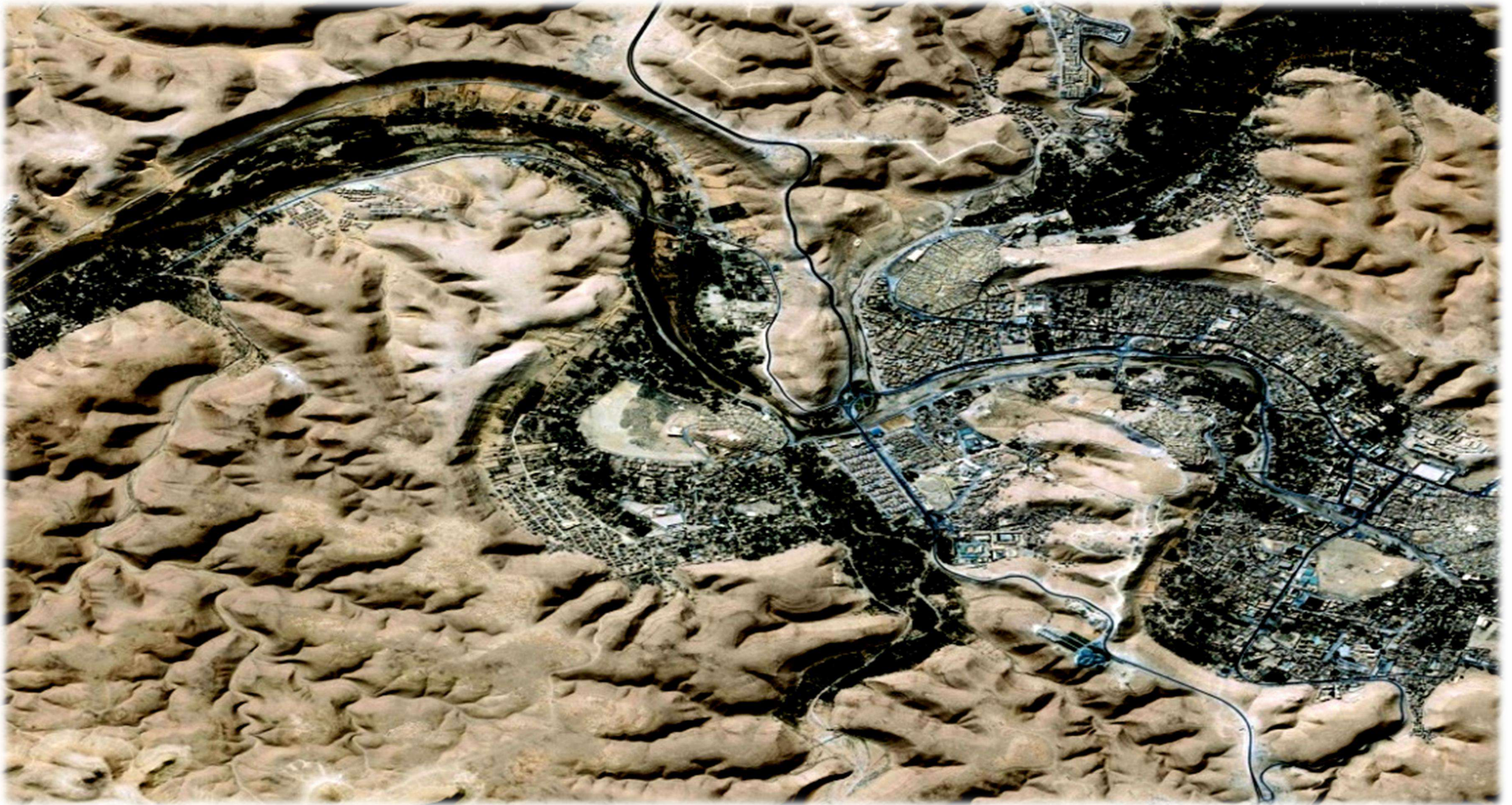
c) The stairs: *Ils sont construits ,soit sur un blocage de pierres, soit sur deux murettes, soit sur un arc, soit encore sur des poutres de palmier. La maçonnerie est formée de moellons liés au Timchent additionné ou non de sable. La cohésion et l'équilibre de L'ensemble sont assurés par la bonne résistance et la grande adhérence du Timchent. Les marches finies sont brutes d'enduit ou badigeonnées .*



C'est une véritable oeuvre d'art, qui ne manque pas de susciter l'admiration de tous ceux qui la voient



The River of Ghardaia the natural Disaster



Oued of GHARDAIA



Oued of GHARDAIA



Inondations à Ghardaïa : les pluies torrentielles révèlent les failles des infrastructures urbaines



By **DJAMEL. K** – 13 mars 2026

Aucun commentaire

3 Mins Read



Facebook



Twitter



LinkedIn



CONCLUSION :

- ***The architectural heritage of Ghardaia reflects a very simple traditional culture and it is true that RAVEREAU did not exaggerate in naming his book "The M'zab: a lesson in architecture" because it remains a very vast source of inspiration which inspires the best architects of all time.***